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# "HALL OF FAME" FOR TREES

## THE WESLEY OAK

**T**HE Wesley Oak, on St. Simon's Island, off the coast of Georgia, is one of the trees of America which well deserves a place in the "Hall of Fame" of historical trees, for which it has been nominated by Mrs. Mary M. North, of Herndon, Virginia, and Joseph P. Jay, Editor of the "Christian Advocate."

Among the noble oaks of the country there is not one more beautiful nor more symmetrical in its spread of branches. Additional interest to the sightseer and traveler is its drapery of Spanish moss, which covers it like

a veil festooned from royal, towering crown to well-anchored trunk, and finally sweeping the friendly ground which sustains it and drinks in the gentle showers or beating rains which fall through the wide spreading branches of the great tree. Behind this aged, yet ever young tree, and under some of its sheltering branches, is an Episcopal church, while only a short distance away is the orphanage of the church. Our country was very young when this oak, which was destined to become famous, was used as a sanctuary by the preacher, who was of the Wesley family, a clergyman of the Church of England, and the son of a clergyman, but who was protesting against some of the usages rife in church quarters at that time. When the brothers, John and Charles, came to America, they were still in the An-

glican Church. Both John and Charles preached under this oak to the British soldiers who were quartered upon St. Simon's Island.

During the early part of the last century the remains of the old platform which the preachers used for a pulpit were still standing. The tradition of that section records that in the early days there was a fort at Fredericka, where the British made a stand against the Spanish, and some of the cannon are there yet. It was to the men in that fort that the Wesleys preached, as

well as to others. John Wesley also preached in a church in Savannah and had a Sabbath school in that place, his brother Charles, the hymn writer, being with him. The two graduates of Oxford, England, came to this country by the invitation of Governor Oglethorpe, of Georgia, who founded Savannah.

No minister was there at that time, and the Governor desired the Wesleys



THE WESLEY OAK

to preach in the young, but growing, country, so they accepted the invitation. John Wesley, a Methodist in practice and belief, but a priest in the Anglican Church, preached his first sermon in America in 1736 and remained in this country until 1737, when he returned to England. There he continued the great work which has made his name famous and familiar both in America and over the world.

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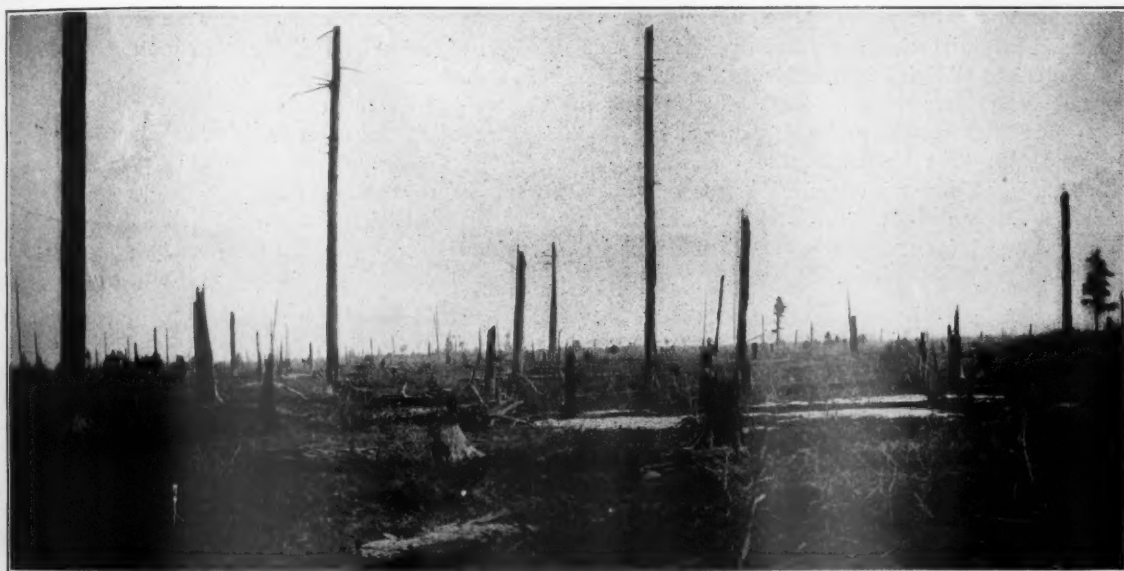
NO. 333

## THE PRESENT AND PROSPECTIVE IN FORESTRY

BY FILIBERT ROTH, DEAN OF FORESTRY, UNIVERSITY OF MICHIGAN

**F**ORTY years ago Sargent in the 10th Census told the people of the Lake Region that if they continued to cut and burn as they were doing then, they would soon be at the end of their pine supplies and have a denuded waste. The lumber papers thought it a joke and invented the term of "denudatics"; the lumbermen and even their

and over 10 million acres, or nearly a third of the State land is unused waste land producing nothing to speak of. As early as 1911 Michigan imported over 500 million feet of lumber for its industries. It cost about 13 million dollars. Easily three millions was in extra price and another three millions to haul it into the State. The cut-



THIS LAND WAS LUMBERED TWENTY YEARS AGO

This cut-over area once had a fine stand of white pine and Norway pine; but when this was cut off the land was neglected and fires killed the young growth and the land which might have been growing another crop of timber is now absolutely non-productive.

cruisers were sure of "inexhaustible" supplies; the local press in the pinery towns scolded any man and any articles calling attention to Sargent's statement; and the legislatures, naturally paid not a particle of attention to the outlook for the second largest industry. Even the friends of the forest, the little handful of enthusiasts who neither owned timber nor sold lumber, could hardly grasp the situation; "Oh, we shall cut closer, use smaller timber, use steel and cement and the supply will last a considerable time beyond Sargent's estimate."

But Sargent was right, his forecasts have come true; Michigan today does not cut the one-hundredth part as much pine, and cuts mere rubbish compared to the White Pine of those days. Michigan forests are destroyed; the land is denuded; the lands are not settled;

look is this and the estimate safe; during the next 100 years Michigan is going to spend 500 million dollars paying fancy prices and profits, and another 500 million dollars in freight rates to get lumber. And prices will be such that neither people, nor their crops will be satisfactorily housed from now on. We are told that the farm home is 50 per cent under-built; the outlook is that it will stay right there and even get worse; no "whooping" and "boosting" and orating of "back to the land" is going to change this by one hair.

The Capper Report printed last year is the last word on the forestry situation for our country; it is amply correct, and probably as correct as any we shall ever have. The Capper Report tells us some astonishing facts; our virgin forests are cut to about 1-5 of their former area.

From an address delivered to the Pennsylvania State Forestry Association, June 16, 1921.



Two-thirds of our virgin forests are west of the great Plains and with this goes the alarming fact that nearly 78 per cent of our merchantable softwoods, or about half of all our lumber, is out there and will cost \$15.00 per M ft. b. m. just to haul to Chicago. It is more than mere rumor that says that a good deal of this timber comes to Pennsylvania and goes clear to Massachusetts in spite of the freight, and that much of our lumber costs the retailer today as much for freight as it does for lumber. But \$15.00 per M ft. is a big sum; for this price foresters in the old world can raise it; and we in Michigan could do the same and make our 10 million acres of waste land bring in some 30 to 40 million dollars per year besides making our North Country one of the finest recreation districts in the world. Fifteen dollars used to be fair pay for a thousand feet and now, and from now on it goes in merely for extra haul.

The Capper Report tells us that we still use some 25 billion cubic feet of timber per year; that we burn up about one billion cubic feet and incidentally cut and use more lumber than the rest of the world all put together. Colbert said: "France will perish for lack of timber;" we always said: "The United States prospers because it has all the good timber it can use." What we want is to have our children also prosper, and not turn over to them a devastated forest waste, an empty mine, plenty of taxes and a foolish appetite for luxury.

The Capper Report says that we use and waste about 26 billion cubic feet and that we grow about six billion feet. Our growth in volume, then is less than one-fourth our use, and in value or dollars it is not one-eighth. How long can we keep up this losing business? Not long. The standing supplies are estimated at 745 billion cubic feet. If high prices keep cutting down our homebuilding, so that we use less in the future in spite of a growing population and even if we reduce from 25 billion of use to 20 billion, we shall use 400 billions every 20 years and by 1960 we shall be down to 15 years' consumption and in a truly serious condition as regards the timber business, the housing problem and particularly agriculture.

What shall we do about it? Why not turn to the Old World where the different people have worked on this problem for centuries and have solved it quite to their satisfaction?

We naturally turn to France as the cradle of forestry and forest legislation. There, after centuries of forestry (and some of it most excellent), the famous minister Colbert said in 1660: "France will perish for lack of timber;" and Raux today (1919) condemns undue liberty in cutting timber and advocates that all cutting be marked by properly prepared foresters.

In France King Philippe de Valois in 1346, or nearly six centuries ago, passed a law demanding the *sustained yield*; a law which required every forest owner to keep



THIS FOREST HAS BEEN CUT BY FORESTRY METHODS

An indication of proper cutting of a forest is this illustration of a timber sale cutting in the Big Horn National Forest, Wyoming, where the trees which are to be felled are marked by the foresters and the brush collected and piled to minimize danger of a fire.





WHERE THE FOREST HAS BEEN PROPERLY CUT

Note how the brush has been piled for burning or removal in order to prevent forest fires, how cordwood has been stacked and how sufficient seed trees have been left to develop a new growth.

constantly a body of growing timber on the land. Thirty years later Charles V. strengthened the forest laws by one of 52 articles, and in this law again emphasizes the simple fact: "The cut must not take more than the growth."

Various laws followed, but, in keeping with affairs of those times, things became lax, and in 1669 Colbert issued his "Ordonnance," the most quoted forest law ever promulgated, after seven years of work by a select commission of over twenty men. Of this law the French forest authority Huffer in 1907 says: "This law of 1669 is primarily a law of *organization* and *control*;" and he also states emphatically that it did not order or forbid any particular method of silviculture.

In the main the law required all cutting of the timber to be done according to a definite plan, approved by proper authority. The Revolution somewhat upset things; but the leaders promptly realized their mistakes; the law of 1827 practically returned France to the law of 1669 and an effort to change in 1888 was rejected. And the result is that France has plenty of good timber, even if not as much and as good as the good foresters Raux and others think she should have.

The little Republic of Switzerland, dating back 600 years with an area little over a third of Pennsylvania and about three million people tilling less than 20 per cent of the land, has had a most instructive experience in forestry.

It is here where King Ludwig of France gave his

daughter Hildegard, Abbess of Zurich, the famous Sihl forest as early as the year 853, and where the city has owned this forest over 1,000 years and has it today in just as fine a condition as ever before, after cutting a yearly crop of timber for over ten centuries.

But Switzerland is a Union of 22 Cantons or very independent states; the "Kantonli Geist" is a full equal of our "States Rights" spirit; it has poor mountain districts as well as industrial towns; in short it combines as wide a range of conditions as our country and its development of forestry and is therefore most interesting.

Forestry in the Canton of Zurich, with its famous city forest, was of the best for centuries; forestry in the mountain districts with people largely dependent on their few goats and cattle was of the poorest; Switzerland imported firewood and timber. The forests belonged largely to the villages and towns; the Union owned about 5 per cent, and the villages claimed authority; and opposition to change was strong. Like with us forestry education by forest associations set to work and the constitution was amended, and in 1876 the National Government assumed authority over all forests in the mountains, passed a law in which three things stand out:

- (1) The forests must not be divided in areas, or broken up by sales.
- (2) The volume of the cut must be prescribed and the cut follow a plan, which maintains a growing stock of trees.

(3) All areas cut must promptly be restocked.

In 1897 the Constitution was again amended; the Union Government was given more authority this time over all forests and waters; the law of 1902 was adopted by referendum vote of the people in 1903. Article 31 of this law declares:

*"The forest areas of Switzerland must not be diminished."*

The principal points in the law are:

(1) The cut of timber must be a sustained cut, the growing stock on the land must be maintained in volume and quality according to an approved plan.

(2) Partition and sale of village, town, etc., forest is forbidden.

(3) The private owner can demand that his forest be bought by the government if he feels unable to manage it properly.

There is no effort at any teaching or prescribing in matter of silviculture, it is simply a matter of maintaining the forest in area, and in its cover of growing trees.

Fortunately for both France and Switzerland

the forests were not owned by a half nomadic lumber industry, in badly distributed tracts, but were largely in well rounded properties and in long lived ownership of old families, villages and towns or else of State.

And now what shall we do with our forests in the United States? Why not copy from the Old World, especially in a matter like forests, where any measure, to be of value, must go on for a century? In principle the case is simple: there is nothing difficult or myste-

rious about it anywhere, it is a case of good will and good intentions. Just as in farming, in road building, in education and other necessary enterprises of the people, all countries come to about the same plans and all plans must use methods simple enough to apply, and effective enough to accomplish the task. In the United States as in Europe the two great points in forestry are:

Keep enough land area in forest.

Keep every acre covered with growing timber.

In the United States the task is threefold:

(1) Regulate the cut on all the forests we still have.

(2) Improve the growing stock of timber on the better cut over lands.

(3) Plant up the 80 million acres of waste



AN EUROPEAN SECOND-GROWTH FOREST

This forest of Norway spruce in Austria-Hungary has now reached middle age, and shows what kind of second-growth forest the United States might have had on land which is now desolate had it been cared for properly.

land where devastation is complete and nature refuses to restore the growth. Of these three tasks number one is the most important and urgent; if this is neglected a tim-

(Continued on Page 574)

# THE PINES OF THE SOUTH

BY J. S. ILLICK

THE South is the home of the Yellow Pines. They produce enormous quantities of the most useful wood that grows in America. More than one-third of all the lumber cut annually in the United States is produced by

the Yellow or Hard Pines of the South.

Southern yellow pine is often called the wood of a thousand uses. It may not have exactly a thousand uses, but it is so intimately associated with our daily life that it would be difficult for us to get along without it. We use not only the lumber of the Southern pines, but also large quantities of other products derived from them, such as tar, resin, turpentine, and oil. The Southern pines comprise seven different kinds of trees. Some of them are well-known, occur over a wide range, and produce large quantities of valuable lumber, while others

are little known, occur over only a restricted territory and produce only small quantities of very ordinary to inferior wood. The wood of the seven southern pines grades into each other so freely that only three commercial kinds of southern yellow pine lumber are generally recognized, viz: 1, Longleaf Pine; 2, Shortleaf

Pine; 3, Loblolly Pine. These three kinds of southern yellow pine are the standard kinds now recognized in the general lumber trade. They are, however, not the only names used, for such other names as Georgia Pine,

Yellow Pine, Southern Pine and North Carolina are also common in the lumber trade.

The characteristics by which the three standard kinds of southern yellow pine wood may be recognized are not difficult to apply. They are given in the following outline: *Longleaf Pine*—1.

Growth rings mostly narrow; uniform in width and outline; from 8 to 12 or more rings per inch.

2. Wood extremely heavy, hard, and very resinous; uniform reddish yellow to reddish brown. 3. Sapwood thin.

*Shortleaf Pine*—1. Growth rings mostly of medium width; usually from 6 to 8 per inch.

2. Wood medium in hardness and weight, and moderately resinous; whitish brown to reddish brown. 3. Sapwood variable, but usually rather thick. *Loblolly Pine*—1. Growth rings very variable but usually extremely broad; from 4 to 6 rings per inch. 2. Wood variable from hard, compact and strong to light, coarse and brashy; yellowish to red-



A SPLENDID STAND OF LONGLEAF YELLOW PINE IN LOUISIANA

The straightness and stateliness of the stems of Longleaf Pine are among its distinctive features. Stands such as this cover extensive areas and are made up of as fine tree specimens as one can find anywhere in the country.



dish or orange brown. 3. Sapwood very thick. While the wood produced by the southern pines is grouped into only three standard kinds, it is actually produced by seven different kinds of trees. The common and scientific names of these seven trees are:

COMMON NAME	SCIENTIFIC NAME
1. Longleaf Pine	<i>Pinus palustris</i>
2. Shortleaf Pine	<i>Pinus echinata</i>
3. Loblolly Pine	<i>Pinus taeda</i>
4. Cuban Pine	<i>Pinus heterophylla</i>
5. Pond Pine	<i>Pinus serotina</i>
6. Spruce Pine	<i>Pinus glabra</i>
7. Sand Pine	<i>Pinus clausa</i>

These seven trees vary widely in their economic importance. The first three produce large quantities of wood and other forest products of high commercial value, while the last three are trees of little economic importance on account of their restricted range and small size. All of the southern pines belong to the Yellow Pine group. They are called yellow pine because of the yellowish color of their wood and bark. They are also called hard pines because their wood is very hard in comparison with the wood of such trees as white pine and sugar pine, both of which belong to the soft pine

group. The wood of the southern yellow pine is famed, not only for its hardness, but also for its strength and durability. In fact, the wood has such good qualities that it is put to a wide range of uses in every part of the civilized world. The pine forests of the South have been exploited for naval stores and other forest products from the time of the first settlers, but there was no ex-

tensive development of the lumber industry until the early seventies of the last century. It was then that the yellow pines of the South were first placed upon the market on a large scale. The wood was then exceedingly low in price. This created a strong demand for it and as a natural consequence, by the early nineties southern yellow pine was leading the country in the cut of soft wood lumber.

In 1909 the production of southern yellow pine reached its peak. It then produced nearly one-half of the entire country's cut of soft woods. It is still the most important single factor in the lumber products of the United States. It furnishes about 35 per cent of the total lumber cut of the country. Experts predict that it

will remain an important factor for the next ten or fifteen years, but it is also believed that within the next eight or ten years a profound change will take place for it is very evident that its supply is being rapidly exhausted.

Each of the seven pines of the South has a number of striking distinguishing characteristics, which are present at all seasons of the year. One can find very evident differences in their leaves, cones, bark and the soil upon which they prefer to grow.

Today the area of original yellow pine forests is somewhat more than 23 million acres or a little less than one-fifth of the original area. The stand of timber upon this remaining area is about 139 billion board feet, or a little over one-fifth of the original stand.

The following simple table gives the principal characteristics of each species:



SHOWING DISTINCTIVE CHARACTERISTICS OF CONE AND LEAF

Left—(Shortleaf). The needles usually occur in twos and sometimes threes, rarely fours, and they run from two to four inches long while the cones are oval, about two inches long.

Right—(Longleaf). These needles always occur in threes, and are 9 to 15 inches long, while the cones measure from 6 to 9 inches long.

## HOW TO TELL THE PINES OF THE SOUTH

NAME	LEAVES	CONES	BARK
Longleaf Pine	Occur in 3's, 9-15 inches long.	Occur near end of season's growth, 6-9 inches long.	Thin, bright, reddish-brown, rarely scaly.
Shortleaf Pine	Usually occur in 2's, sometimes 3's and occasionally 4's, 2-4 inches long.	Oval, about 2 inches long, open at maturity.	Broken in oblong plates, light reddish-brown, somewhat scaly.
Loblolly Pine	Occur in 3's, 3-7 inches long.	Oblong, 3-6 inches long, open soon after maturity.	Bright reddish-brown, broken into oblong plates.
Cuban Pine	Occur in 3's, 8-12 inches long.	Oval to conical, 3-6 inches long.	Dark reddish-brown, scaly and shallowly furrowed.
Pond Pine	Occur in 3's, 6-8 inches long.	Oval, pointed, 2-4 inches long, rarely open, persist long.	Dark brown, broken into square or roundish plates.
Spruce Pine	Occur in 2's, less than 2 inches long.	About 2 inches long; cone-scale, prickles short or wanting.	Light, reddish-brown, scaly and shallowly fissured.
Sand Pine	Occur in 2's, 3 inches or less in length.	About 3 inches long, armed with persistent spines.	Bright, reddish-brown, scaly, deeply furrowed.

The Longleaf Pine is one of the most valuable evergreen trees of the United States. What the White Pine was to the forests of the Northeast and the Lake States, the Longleaf Pine was, and in restricted areas still is, to the forests of

the Coastal Plains region of the South. It occurs from Norfolk, Virginia, to the neighborhood of Tampa, Florida, and west along the coast to the Trinity River in eastern Texas. Seldom does it extend inland more than 150 miles, and in some regions its range is less than 50 miles in width. Few trees have a longer list of common names than the Longleaf Pine has. It has no less than 28 and some claim

that it has 33 common names. Of all the common names, Longleaf Pine is the most appropriate, for its leaves, which range in length from 9 to 15 inches and occasionally reach 18 inches, are truly distinctive. Other common names are Pitch Pine, Turpentine Pine and Fat Pine. These

three names refer to its resinous wood. It is also called Heart Pine because of the large proportion of heartwood produced, and the hardness of its wood gave it the name of Hard Pine. Many of its common names are

long, and often have the names of states as a prefix. Among these combination names are Long-leaved Yellow Pine, North Carolina Pitch Pine, Florida Yellow Pine, and Georgia Pitch Pine. Small plume-like branchlets covered densely with leaves and from 2 to 3 feet long, are sold for decorative purposes in northern markets at Christmas time under the name of "Florida Palm" and "Louisiana Palm." The straightness



A GOOD EXAMPLE OF REPRODUCTION

This is a typical reproduction area in Louisiana about fifteen years old and under conservative logging for about that length of time. The species are mixed, being longleaf, shortleaf and loblolly.

and stateliness of the stems of Longleaf Pine are among its distinctive features. Pure stands often cover extensive areas and are made up of as fine tree specimens as one can find anywhere in the country. The attractive appearance of many trees is, however, marred by the



BARK OF THE LONGLEAF YELLOW PINE

The stem of the Longleaf Pine is straight, tapering but slightly and it is usually free from limbs for more than one-half way to its top. The bark is thin and orange brown, separating on the surface into large, papery scales which lie flat against the trunk.

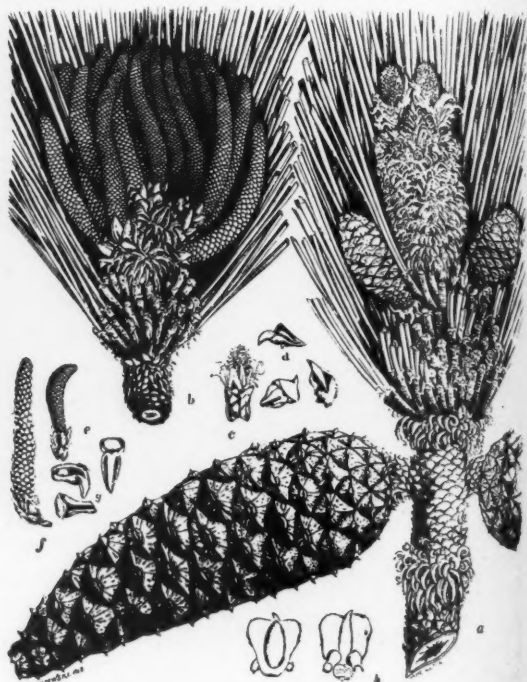
scars which they bear from resin tapping operations. The height of its stems rarely is more than 120 feet, and a diameter of  $2\frac{1}{2}$  feet is seldom exceeded. Probably the average tree cut in lumbering operations does not exceed 80 feet in height and 2 feet in diameter breast-high.

Longleaf Pine is emphatically a light-demanding tree and very exacting in regard to climatic and soil factors. These exacting demands are restricting the development

of young trees, and the strong demand for its lumber is making heavy inroads on the rapidly decreasing supply of mature timber left in the forest. Unless something effective is done at once to protect the young growth and regulate the supply of the existing timber, the time is not far distant when Longleaf Pine will hold a low place in the American lumber industry and play a very subordinate role in the future practice of forestry in the South.

For more than two centuries Shortleaf Pine has held a prominent commercial place in the American lumber industry. It is found over an area covering more than 440,000 square miles and is of commercial importance on at least two-thirds of its natural range. Its natural range extends as far north as Western Connecticut, but near Mont Alto in Franklin County, Pennsylvania, is believed to be the most northern heavy stand of Shortleaf Pine in America. In this stand are many stately trees with trunks  $2\frac{1}{2}$  feet in diameter breast-high, and clear of branches for 60 feet from the ground. These knights of the forest are covered with a distinctive armored bark, fully as typical as any grown in the South.

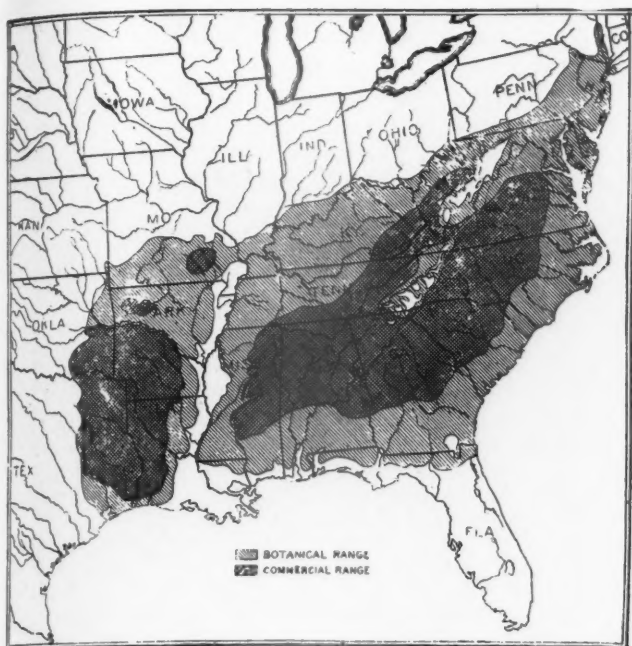
The Shortleaf Pine is commonest in the South, where it makes its best growth at elevation of 400 to 1,500 feet. It does, however, extend from sea level to an altitude of



FLOWERS, CONE AND NEEDLES OF THE LONGLEAF PINE

- a.—Branch with mature cones and female flowers at top, just below which are young cones of one or two season's growth.
- b.—Cluster of male or pollen-bearing flowers.
- c.—Detached female flower.
- d.—Detached young seed-bearing cone scales.
- e-f.—Detached male flowers.
- g.—Detached pollen sacks (anthers).
- h-i.—Detached very young female flowers showing two ovules at the base, which later develop into seeds.





## THE RANGE OF THE SHORTLEAF PINE

The heavily shaded portion of the map shows the commercial range of this famous and much-used wood, while the lighter shaded portion indicates its botanical range. It makes its best growth at an elevation of 400 to 1,500 feet.

3,000 feet in the Southern Appalachian Mountains. The Shortleaf Pine has many common names. Some of them are appropriate, while others are misleading and often embarrassing to one attempting to identify it. None of its fifteen common names will ever replace the name "Shortleaf Pine," for its leaves are truly short in comparison with the Longleaf Pine and the other pines with which it is associated. Its distinctive leaves are slender, from 2 to 4 inches long and usually occur in 2's, but



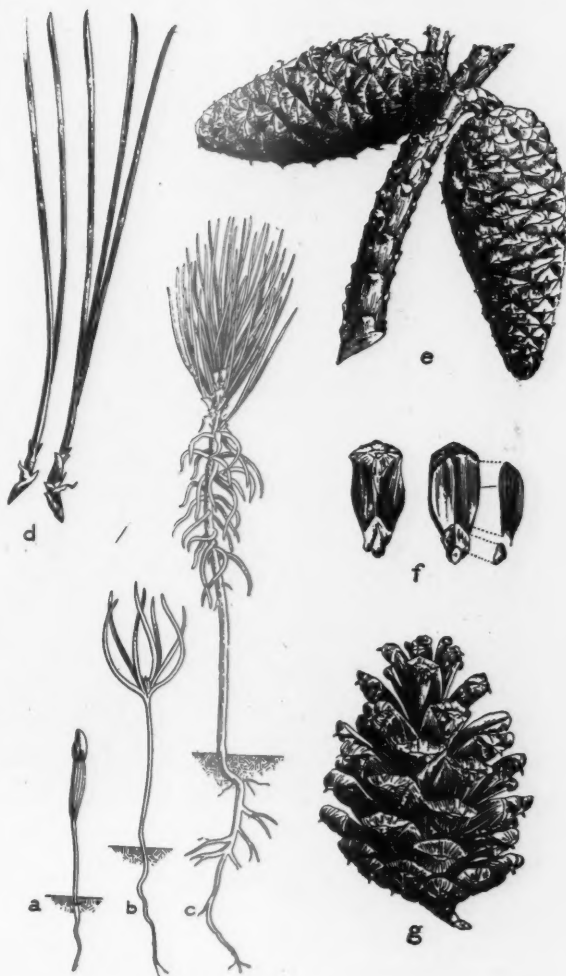
Courtesy Manual Arts Press

## MAP SHOWING THE COMMERCIAL RANGE OF LONGLEAF PINE

It occurs from Norfolk, Virginia, to the neighborhood of Tampa, Florida, and west along the coast to the Trinity River in eastern Texas.

occasionally three appear in a cluster and sometimes four may be together in a cluster.

The cones of the Shortleaf Pine are rather distinctive. They are brown in color, attached to the branches by a very short stalk, from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches long and nearly as wide as long when open. Each cone-scale has an enlarged apex which is armed with a weak prickly. The cones open in early autumn to discharge the small triangular seeds, which are produced in large numbers and scattered widely about the trees. Heavy seed crops are common, which justifies one in being hopeful that nature will propagate this important forest tree and help it gain an important place



## SHORTLEAF PINE LEAVES, SEED, CONE AND SEEDLING

- a—Young seedling.
- b—Same seedling after one month's growth.
- c—Same seedling at end of first season showing early bundles of true leaves.
- d—Two-leaf and three-leaf clusters.
- e—Branch with mature closed cones or burrs.
- f—Cone scale and seed with wing detached.
- g—Mature cone opened.

in the future forestry of the South. Even as far north as southern Pennsylvania a large number of seedlings are found in openings about mature trees and nearby abandoned fields and waste lands are dotted with young seedlings.

The Shortleaf Pine has a long tap root. This enables the tree to obtain water from a considerable depth below the surface. Even in cases of heavy drought the trees do not suffer very much.

The Shortleaf Pine is a companionable tree. One may find small areas occupied by it exclusively, but in the



AN ARMORED KNIGHT OF THE FOREST

Part of the most northern stand of Shortleaf Pine in America.  
Near Mont Alto, Franklin County, Pennsylvania.

major part of its range it is associated either with hardwoods or with other evergreen trees. Pitch Pine and Scrub Pine are common companions, and Loblolly Pine is frequently associated with it upon heavier and rather moist soil. As one approaches the Coastal Plains and other low lying regions of the South the Longleaf Pine is frequently associated with it, and at higher elevations, White Pine and Table Mountain Pine stand by its side. Many kinds of hardwoods such as oak, hickory, sassafras, ash, and cherry are also frequently associated with it.



A YOUNG SHORTLEAF STAND IN ARKANSAS

This is an important timber tree, attaining sufficient size for general forestry purposes, producing excellent wood, a good resin yield and it is markedly adaptable to climatic and soil conditions of the South Atlantic States.



EVEN-AGED MATURE SHORTLEAF PINE IN ARKANSAS

The Shortleaf Pine is a companionable tree and while one may often find small areas occupied by it exclusively, in the major part of its range it is associated with hardwoods or other evergreen trees.

Shortleaf Pine has been an important timber tree for many years and everything points as if it would continue to hold a prominent place in the forest structure of the South. It attains a sufficient size for general forestry purposes, produces excellent wood, yields satisfactory resin and is well adapted to the climatic and soil conditions of the forest regions of the South Atlantic States. It can be regenerated naturally with a satisfactory degree of success, and nursery practice has been so developed that seedlings can be raised satisfactorily and transplanted into the forest. It follows that natural regeneration will take place rapidly wherever favorable conditions are at hand, and if we help nature propagate and perpetuate this tree by planting up such abandoned fields as may



THE GROSS CHARACTER OF THE SHORTLEAF PINE IN CROSS-SECTION

This important commercial wood is medium in hardness and weight, and moderately resinous. It is whitish brown to reddish brown in color. A cross-section of a log shows a broad band of nearly white sapwood surrounding the pale reddish-brown or orange-colored heartwood. The well-defined rings of annual growth are bands of light-colored soft wood surrounded by darker bands of denser, harder and more resinous wood.

develop from time to time, we can be reasonably sure that the future of Shortleaf Pine is promising.

The Loblolly Pine has twenty-two common names. Some of them are quite appropriate, while others are misleading and meaningless. "Old Field Pine" is an appropriate name, for this tree is quite common in old, abandoned fields. Few, if any, trees show such persistency in encroaching upon and occupying abandoned fields and



BARK OF THE SHORTLEAF PINE

The light reddish-brown bark is rather thick and is broken into oblong plates which are covered with thin, cinnamon-red scales that peel off easily.

open places. This tree did an heroic piece of work after the Civil War in restoring a forest growth upon thousands of acres of abandoned farmland in the South.

Commercially it is classed with the other southern pines and sold as Yellow Pine, Southern Pine, North Carolina Pine, or Georgia Pine. Its scientific name is *Pinus taeda*. The second part of its scientific name is inappropriate, for the word *taeda* means "torch," and authentic records tell us that the resinous heartwoods and knots of this tree were not used for torches, as was done with some of the other eastern pines.

The natural range of Loblolly Pine lies in a belt about two hundred miles wide along the Atlantic Coast from Delaware to Florida, and from there along the Gulf of



Mexico to Central Mississippi. It extends over the entire State of Alabama, all of Eastern Mississippi, and a part of Central and Western Tennessee. There are also large areas of it in Texas, Louisiana, Arkansas, and Indian Territory. Over vast areas west of the Mississippi this tree forms extensive pure stands, and there the trees attain a large size and develop a good form. Locally, in the eastern and northern part of its range, pure stands are also found, especially where they have developed in abandoned fields and other vacated places. Under favorable conditions, with plenty of overhead light, the Loblolly Pine develops a long straight trunk, free from branches for 50 to 75 feet from the ground, and reaches a diameter of from 15 to 24 inches, breast-high. Exceptional specimens sometimes reach a height of 120 feet, and a diameter of 3 feet. The Loblolly Pine is not fastidious in its soil requirements, for it will grow on a great variety of sites. In fact, it is adapted to a wider range of soil conditions than any other pine with which it is associated. It grows best on deep, moist, well - drained, porous soil, but



A STAND OF OLD FIELD LOBLOLLY

This has attained merchantable size and it is said that the future of Loblolly is extremely promising, as there is a keen demand for the wood that it produces. Its rapid growth rate and adaptability to soil unsuited for agriculture assure it a place of its own in the development of forestry in the South.



AN UNEVEN-AGED STAND OF LOBLOLLY PINE IN MARYLAND

One of the common names of this species is "old field pine" and it is most appropriate for this tree is quite common in old, abandoned fields. The South owes a debt to the Loblolly Pine for after the Civil War it reforested vast areas of abandoned lands.

also makes a satisfactory growth on dry and rather sterile situations. It is the intermediate soil which it prefers, and for its best development it needs plenty of light. One of the best features of the Loblolly Pine is its thick bark. Trees from 12 to 14 inches in diameter at breast-high may be covered with a bark 1 to 2 inches thick. This unusually thick bark makes it the most fire-resistant of the southern pines, and gives it a place along side of the fire-resistant Pitch Pine of the Northeast. This fire-resistant quality recommends it highly for general forestry purposes. It also possesses other valuable features which make it highly important, wherever possible, to put forth special efforts to perpetuate it as an economic forest tree. The rate of growth of Loblolly Pine varies considerably with the condition and composition of the soil. On the average soil it makes a very satisfactory growth. As a rule, it grows more rapidly than the Longleaf Pine or the Shortleaf Pine. Its wood is coarser and less durable than that of the other pines with which it is commonly associated, yet there are many uses to which it is being put, and present

market conditions indicate that the growing of Loblolly Pine may be more profitable in the future than that of any other southern pine. Its future is bright, indeed, for there is a keen demand for the kind of wood that it produces, and its rapid rate of growth and its adaptability to soil unsuited for agriculture tend to give it a prominent place in the practice of forestry in the South.

The Cuban Pine is the handsomest of all the southern pines. It occurs along the coast from South Carolina to the valley of the Pearl River in Louisiana, and is also found in Cuba, the Bahamas and the highlands of Central America. It is distinctly a coast tree and it is doubtful if the occurrence of this tree can be extended much beyond its natural range, which usually reaches from 30 to 100 miles inland. Where the ground is not too wet it is often associated with Longleaf Pine. The latter tree has longer, more flexible and more drooping needles and larger cones than the Cuban Pine. The wood of Cuban Pine is very hard, heavy, strong, durable, and fully as hard as Longleaf Pine and used for about the same purposes. While it is probable that the range of the Longleaf Pine will be reduced unless special protection is given to it, on the other hand the range of the Cuban Pine may be extended, for it grows rapidly in youth and is an excellent competitor with its associates.

The Pond Pine is a medium-size tree usually 40-50 feet high and rarely exceeding 2 feet in diameter. It occurs in wet flats and peaty swamps along the coast from North Carolina to the banks of the St. John's River in Florida. In the northern part of its range it is associated with the Loblolly Pine and in the southern part it grows with the Cuban Pine. Among its chief distinguishing characteristics are its leaves, which are 6-8 inches long and occur in 3's. Its oval, pointed cones are 2 to 4 inches long and persist for many years. The wood is occasionally sawed into lumber; the low grades are sold as Loblolly Pine and the best grades as Longleaf Pine. Locally, it is tapped for resin which flows rather freely and is fair in quality.

The Spruce Pine is a medium-size tree found on fresh, damp soils and occasionally in swamps from South Carolina to Florida and eastern Louisiana. It usually occurs singly or in small groves, except in northwestern Florida, where it occupies areas of considerable extent. It is easy to distinguish the Spruce Pine from all other southern pines by its short needles, small cones, and reddish-brown and deeply furrowed bark. The needles are in clusters of two and are less than two inches long. Sand Pine is the only other southern pine with needles regularly in clusters of two and usually less than three inches long. The wood resembles that of Loblolly Pine but has little commercial value.

The Sand Pine is a small tree found along the coast of Florida and southern Alabama. It seldom extends inland for more than 30 miles and rarely exceeds 25 feet in height. It reaches its best development in eastern Florida, but rarely is a specimen found which exceeds one foot in diameter. The trunks usually bear lateral

branches down to the ground. Exceptionally good specimens are occasionally cut for small shipmasts. The tree is used chiefly as a soil binder on shifting sand areas so common in the region where it grows.

One of the first steps necessary to the practice of successful forestry in any region is to know the trees which



VETERAN LOBLOLLY PINE TRUNK

One of the best features of Loblolly is its thick bark. Trees from 12 to 14 inches in diameter at breast-height may be covered with bark 1 to 2 inches thick. This gives the tree an unusually high fire-resistant quality.

are to be handled. An attempt has been made in this article to set forth the distinguishing characteristics of the seven southern pines and to point out a few of their most striking features and peculiarities. Each of the southern pines has habits of its own, and by knowing all of them, it will be possible to give a proper place to each separate species in the forests of the future.

The southern pines are known commercially in all parts of the world. Their wood and the naval stores derived from them have been big factors in the indus-

(Continued on page 574)

# EDITORIAL

## BUSINESS MEN MAY SOLVE FORESTRY PROBLEM

HAVING heard evidence regarding the condition of the forests, the need for measures to perpetuate what forest land is left, and for funds for proper protection from fires, the National Forest Policy Committee of the Chamber of Commerce of the United States is now preparing its conclusions. What this committee recommends will have tremendous weight in determining just what legislation is needed to assure the United States a forest supply for its future needs. Its recommendations will be placed before Chambers of Commerce throughout the country in the form of a referendum, the result of which will be given due consideration by Congress.

The Chamber of Commerce of the United States has done few things of more lasting importance than the investigation of the forestry situation. The outcome will have an effect from which future generations will profit much more than the present, but the citizens of today will have the satisfaction of knowing that they have done for posterity what their forbears by reason of abundant resources and low values could not afford to do for them.

It is safe to say this because there is no doubt now about Congress providing initial forestry legislation which will go far toward meeting forestry needs. The entire country is now aroused to a point where it is demanding reforestation of cutover lands, better protection from forest fires, provisions for growing new forests, and for long time or perpetual production from our existing forests, but it has not found a way to pay for it. Forest products are still a long way from selling at cost of production of new forests.

The Chamber of Commerce Committee has heard the evidence of foresters, timberland owners, lumbermen,

shippers, tax experts and lawyers on every phase of forest growth, protection, taxation, cutting and marketing, and from the mass of information should, and undoubtedly will, be able to be of tremendous service to Congress in indicating the kind of legislation which will best meet all the requirements of the situation.

Citizens have occasion to congratulate themselves because the clear-sighted business men on the committee having heard all sides of the problem will now be in a position to suggest a solution.

There are now two forestry bills before Congress, the Snell-McCormick bill advocated by the United States Forest service, the American Forestry Association, the National Forestry Program Committee, many state foresters, and others, and the Capper bill, backed by former United States Forester Gifford Pinchot and a number of his followers. Each bill will undoubtedly meet with opposition when it is argued before Congressional committees. Each bill will certainly be declared by some to be incomplete, and they will have amendments to suggest; and quite as certainly no one is likely to propose a bill on which all foresters and others best informed on the subject will agree. Thus opportunity for constructive legislation may be lost by lack of harmony in thought and principle.

In this situation then the Chamber of Commerce Committee, having the advice and opinion of the most enlightened minds, has the opportunity to do for the people of the United States a service from which generations will profit—it has the opportunity of pointing out to Congress the legislation required to protect our remaining forests, to create new forests and solve the whole vitally important forest problem.

## INTELLIGENT MANAGEMENT OF CITY PARKS

WITH the return this summer of the open season in our city parks came a marked renewal of public interest in these invaluable recreation centers. And the outstanding result of this renewed interest it seems is the fact that the public is now awakening to the present unsightly and unkept condition of the parks.

While there are no doubt competent and sincere officials in charge of our parks, it is also true that the greater number are selected for political reasons only, without a thought as to their competency or knowledge of the work they are expected to properly direct or to do. And as a sequence, the already large appropriations are squandered with very little that is concrete to show for the year's work and expenditure.

The fact that there are fine specimen trees and shrubs in our parks, many of which have required many years to develop, does not indicate that such trees need no further attention. On the contrary, a tree which has taken years to develop may be by neglect wholly lost

or seriously injured in a single season for want of proper attention, in not removing the dead wood, or from insect pests, lack of good soil and other causes. Unfilled cavities and dead wood not only aid in the destruction of trees and shrubs, but surely mar the beauty and destroy the landscape effect, as do also dead trees and shrubs not removed.

In a word then, cannot this awakening interest and efforts of the public spirited be made to bring about a new order which will put competency and knowledge before party favor and political motives in the selection of park officials and thus assure the people and the taxpayers of conscientious and efficient management of the parks, thus paving the way for better things to follow.

In a recent address Hon. E. T. Meredith, former Secretary of Agriculture, remarked "that politics has no place in matters of this kind," which sentiment rings true as especially applied to the care and management of our city parks.



## A PERMANENT FOREST COMMUNITY

WOOD TURNING contains an interesting account of a permanent forest community which affords a pleasant contrast to the deserted villages that in so many regions have followed in the wake of the lumber industry. Already for three-quarters of a century the factory which supports the little settlement at Forestdale, Vermont, has been producing small handles, toys, and other wood turnings. Moreover, there is every prospect that it will continue to do so indefinitely, since its owners have taken the very wise precaution of safeguarding its supply of raw material. Some 8,000 acres of forest land have been acquired and are being so handled as to insure a perpetual supply of timber from them. Considerable forest planting has been done and improvement cuttings are being made. Net profits of about \$128 from two thinnings of a five-acre lot of white pine show that the benefits from such work are not necessarily confined to the future.

From a social and economic standpoint Forestdale bears striking witness to the value of permanence in our forest and wood-using industries. Not only does the wood-turning plant continue to add year after year to the world's wealth, but its employees are able to establish themselves in permanent homes, most of which they own, and to bring up their families in the midst of a comfortable and wholesome community life. Many of those now at the plant are the children and grandchildren of older employees, and there is a general friendliness and recognition of mutual interest between the workers and the management which is impossible in the unwholesome atmosphere and surroundings characteristic of so many purely temporary enterprises. From every point of view there is a decided advantage in the permanence which only the practice of forestry can impart to industries dependent on forest products for their supply of raw material.

## WOMEN WORKING FOR FORESTRY

THAT women can work for forestry and can aid materially in getting trees planted and in securing forestry legislation is the fact which Julia Lester Dillon, chairman of forestry for the Georgia Federation of Women's Clubs, states in a letter she has sent to the members of the clubs. Mrs. Dillon says, and what she says applies to women in every state: "The day is past when the women of Georgia can be content with the planting of a few trees, the location of a few others and the conservation of all, and call it forestry work. The day of greater effort has come. The day of great opportunities for service is with us. Hear the clarion call. Education is the first step in any forward campaign. Therefore, the first item for the development of the forestry department is information. To secure this it is necessary for the clubs and club members individually to identify themselves with the work of the American Forestry Association by becoming members, which insures to them the AMERICAN FORESTRY magazine, which is one of the most interesting and beautiful magazines published. Other states are calling upon their Boy Scouts to replant deforested areas. Twenty-five boys of New York planted 14,000 trees in the John Burroughs Memorial Forest this spring. In another state the Boys' Farm Clubs are being interested by the farm demonstration agents in the work of the forestry department. Each club is studying timber resources, locating denuded tracts, planning to replant waste areas, learning how to cut out the timber that is ready, learning what not to cut, planning to reclaim washed-out lands by planting trees with wide-spreading net-like roots to fill up the gulleys and hold up

the washed banks. Can you think of anything that will mean more to the agricultural future of the state? Why not Georgia? If the women's clubs can secure the cooperation and interest of these agents and through them of the boys themselves and next winter when farm work is light set about having reforestation done, the greatest factor for present usefulness and future welfare is secured. If the boys of today plant over the denuded tracts, help to reforest the watersheds, the men of tomorrow will not need to be urged to pass laws for forest protection. Our legislatures and Congress will perforce listen to the demands of these citizens who ask because they know. Our forestry department stands for the protection of all wooded areas in the State of Georgia. It calls to the women voters to get in line and demand of our legislators, state and federal, protection of our forests. The most crying need right now is the passage of the national forestry bill. A map recently published by the Southern Forestry Congress and sent out by the secretary, J. S. Holmes, Chapel Hill, N. C., shows the whole of our sovereign state of Georgia in the blackened area exposed to fire menace and without forest protection. Is there a citizen who has not seen fire-blackened wastes in our pine forests caused by a carelessly thrown match or cigarette stub or marking a deserted camp site or any one of a hundred causes? Why wait until further damage is done? Can we afford to have our remaining wooded resources burned up, cut over, wasted, in the present as they have been in the past? In the end, as in the beginning, study is needed. We must learn about the forest resources if we would preserve them.

## ENVOIOUS OF PENNSYLVANIA

THE need for senators and congressmen with a proper appreciation of the forestry requirements of their state is aptly illustrated in a forceful editorial in the *Chicago Tribune*, which says: "AMERICAN FORESTRY, the magazine of the American Forestry Association, prints a map in the July number showing an area of 1,000,000 acres, covering more than half of four counties of northeastern Pennsylvania, which is to be purchased by the government to protect the head waters of the Allegheny River and to develop a renewal forest. Is it any wonder that United States senators and representatives from Pennsylvania are returned to Congress by their constituencies term after term? They get practical results for their districts and their state. They are less concerned with panaceas or patent nostrums for the correction of national or international ills than with doing something which will improve the welfare of their constituents and provide for the future of their state. Reforestation is a commendable enterprise. It not only conserves the water supply of a large section of Pennsylvania, but promises to provide

much needed lumber at reasonable prices in the future. Pennsylvania makes it a practical reality through federal aid. The interest of its congressmen in the patent nostrums of legislation is merely in their value for trading purposes. What wise man would not trade a vote for the Norris bill for one favoring purchase of 1,000,000 acres of land for reforestation in his home district? Why cannot the agrarian bloc in Congress do as much for the Middle West? Wisconsin has large tracts of land in crying need of similar reforestation, and worthless for any other purpose. Illinois and the entire Mississippi Valley is in need of improved waterways. At least sixteen states of the Middle West are asking for congressional approval of the St. Lawrence seaway. Many states and thousands of manufacturers want the elimination of the "Pittsburgh plus" system for fixing prices on steel products. There is plenty of practical work for the agrarians in Congress. If the Pennsylvanians can get practical results in Congress why cannot the Middle Westerners?"

## THE SAD STATE OF MICHIGAN

HOW Michigan neglects its forest land, how it allows forest fires to annually add to the destruction already caused by reckless lumbering, and how it might regain some of its lost forest wealth is the subject of a forceful interview with James Oliver Curwood, nationally known as a writer of wild life in the woods.

That Mr. Curwood is indignant when he views the condition of his own state is natural. There is plenty of cause for indignation, and he voices it by saying:

"I have seen scores of forest fires in northern Michigan in the last three weeks and hundreds of thousands of acres burned simply through the lack of proper preventative measures instituted by the state. With proper fire protection service, it would not be difficult to eliminate at least 75 per cent of the burned area we have in Michigan each year.

"In many eastern states, it creates a sensation when a single township burns over. Michigan is at present the worst burned state in the country and this in face of the fact that Michigan is absolutely the best equipped state, naturally, for the propagation of forest and wild life.

"Here we have vast areas of ideal pine land that could be replanted. Instead of replanting, we allow thousands of acres of young trees to burn each year and never make an effort to replant them.

"Michigan could be one of the greatest pulpwood states in the Union and at a time when paper is almost invaluable it would seem that those directing the state's governmental affairs would realize this.

"I believe that I am stating a very fair estimate when I say that the people of Michigan are losing \$50,000,000 a year because of the lack of conservation and propagation, which has been so utterly forgotten by those political helmsmen of the state's affairs.

"There should be organized in Michigan a forest protection system so complete that within a very few years this state would again be the leading lumber and pulp wood state of the Union.

"Not only should forest fires be eliminated, but we should have great state nurseries from which we could plant hundreds of thousands of young forest trees each year. The men who would protect our forests from fire could also be our planters of trees. An expenditure of \$1,500,000 a year would repay the state and its people fifty fold in dollars alone."

Mr. Curwood has the right idea of what should be done. Now, as one of the leading citizens of Michigan and a man of action, let him write and write until he has the people of the state aroused as he is aroused. Then Michigan will have forests again.

## GEORGIA AWAKENS

GEORGIA has at last awakened. The state legislature has passed a forestry bill by an almost unanimous vote. The bill provides for the creation of a state board of forestry to consist of the Governor, the Secretary of State and three citizens to be named by the Governor. The progress of forestry in the state largely depends upon the powers of this board and the appropriation given it for its work. It is to be hoped that the board

will be non-political. That is up to the Governor. Experience in other states has shown that non-political boards usually are able to do much more for forestry than those which consider politics first and forestry second. Let us hope that the Governor will consider forestry much more important than politics. He has a great opportunity to do a great work for his state.

# THE BANDELIER NATIONAL MONUMENT

BY WILL C. BARNES

HERE'S a story in the paper about a New National Park, let's go and see it."

The lady across the dinner table pushed the evening paper under my eyes. I glanced at the headlines to which she pointed. "The Bandelier National

Her womanly curiosity was fully aroused. "Ruins in America; real ruins and in the west at that. I thought the west was new?"

"New nothing," sarcastically, for here I felt on fairly safe footing, "why, the descendants of the ruin builders

were found living among the ancient habitations of their ancestors half a century before the English set foot at Jamestown. Perhaps they were even planting their corn fields and performing their strange ceremonial rites when the Norsemen were building the old mill at Newport. (?)"

I could have overwhelmed her with other information but she cut me short. "Let's go and investigate the Bandelier National Monument this summer."

So we went, and this shall be a record of where we found it and what we saw there.

As all stories must have a beginning somewhere, this may well begin at lovely, incomparable Santa Fe, than which there is no more interesting spot in the United States. About her



THE OLD "PALACE" AT SANTA FE, NEW MEXICO, RECONSTRUCTED ACCORDING TO THE LINES OF A VERY OLD SKETCH RECENTLY DISCOVERED

From the more than three centuries old Governors Palace at Santa Fe, the flags of four different nations have at different times been flown.

Monument," it said. "Pish-tush," I remarked, using the most up-to-date explosive known to the literary fraternity, "that's not a National Park, that's a National Monument." The ignorance of some people is astonishing.

"And what's a national monument?" she blandly inquired.

"A national monument," rather hesitatingly, I'll admit, "a national monument is—is—well it's a—"

"I'm listening," was the only comment.

"Well, a national monument," I began more slowly, "is a cross between a national forest and a national park. It has all the attributes of both; it may be a national curiosity like the Arizona petrified forest, a huge playground like the Muir Woods at San Francisco or a group of these old pre-historic ruins that abound through the southwest." I stopped, fearing to tread further on dangerous ground.

little "plaza" there clusters more of historic interest than about any other acre of ground in the Western Hemisphere. Over the three-centuries-old Governors "Palace" that faces it, the flags of four different nations have at various times been flung to the breeze. Viceroy of



VIEW OF TUFA CLIFFS AT FRIJOLES

A side canon of the Frijoles region. Note the countless holes in the rock, some natural, many artificial.



Spain; Generals and Governors of Mexico; and even bold Indian chieftains have held their official abode within its walls four feet thick. From it in August, 1864, General Armijo, representing the Mexican government, set forth with bombastic proclamations to drive the despised "Gringo" from New Mexico, then part of Old Mexico, but six days later bluff old General Stephen Kearney stood in the self same place and took possession of the country in the name of the United States.

In 1862 the flag of the Confederacy flew from its staff for a few days but its stay was brief and the stars and stripes soon displaced it. Had we seen no more than

and drops—no, almost falls to the river over a steep grade. The stream is bridged with a ramshackle affair of logs that impresses one with the idea that it is likely at almost any moment to drop the passerby into the emerald green waters dancing beneath it.

Here at an old sawmill town we leave the motor, although it is a good auto road clear to the Canyon of the Frijoles, and with our camp outfit packed on two mules and ourselves on saddle horses climb the breast of the mountain over a grade that winds and twists its way upward like some great tawny snake, for the soil here is as yellow as gold. Its a good three thousand feet from



LOOKING DOWN ON THE REMARKABLE AMPHITHEATRE

Almost directly beneath us is a large crescent-shaped object—looking like a huge piece of honey comb and positioned like a great amphitheater. Once a huge pile of rubbish, it has been excavated and exposed to view by the Santa Fe Archaeological Society.

Santa Fe the trip would have been well worth while.

A paper ribbon flung into the air at carnival time could not drop to the ground and form more fantastic curls and loops than does the road that leads out from Santa Fe towards the "Bandelier National Monument." It rises and falls with the contour of the landscape, winding and twisting across the semi-desert region as if uncertain at which point it will break its way through the grim ramparts of the Jemez mountains that loom against the sky line, miles to the northwest. Occasionally to the left and far down below one catches sight of a streak of green water flecked with white; the historic Rio Grande, and finally the road turns abruptly towards it

the river to the top of the mountain and soon we meet the first yellow pines, harbingers of the great unbroken forest above. At the top we plunge into its very deeps through which we ride for twelve miles, the air heavy with its lige-giving odor, across lovely forest parks, their grassy vales dotted with wild flowers of every hue, blue bells, pestamon, Indian pinks, petunias, phlox and a dozen more garden favorites, splashing through happy little rivulets rushing madly towards the river far below, the road ever climbing higher and higher. We turn corners of the mountain where the country falls away steeply and as far as the eye can reach is one great sea of hills and valleys, distant peaks, flat topped mesa

buttes; a glorious panorama radiant with the wonderful coloring of the region.

Clear in the horizon a thin wisp of smoke floats skyward from a train on the main Santa Fe road forty or more miles in an air line from where we sit.

A plunge into a dense thicket of cedar and pinon through which we can scarcely see ten feet ahead, and

woods, alders and pines a rollicky little brooklet, an ideal trout stream but for the fact that a few miles below, it drops over a sheer precipice of almost a hundred feet up which no fish have ever found their way. Half hidden in a grove of trees just under us we catch glimpses of white tents, and the roof of a large stone house from the chimney of which the rising smoke speaks of the good cheer to be found in the home of the representative of the Forest Service who keeps watch and ward over this Pompeii of the New World.

The dirty grey walls of the canyon are pitted with thousands of openings large and small, many of them natural cavities worn by the elements into the friable volcanic dock, but many more are doors, windows and smoke holes drilled into the sides of the canyon by the strange people who once lived here.

Below us on the floor of the valley is a large crescent-shaped object, for all the world like a huge piece of honey comb or a number of small pens built of rock. It rests like a great amphitheatre, the two ends of the crescent coming close together leaving a comparatively narrow opening or passage way into the enclosure or plaza formed by the crescent, which for defensive purposes, might have been closed with a gate. This the Forest Ranger tells us is



THE STRANGEST HOMES IN THE WORLD

Thousands of rooms have been bored into the rocky walls. A line of small holes above many of these rooms is presumed to have been used to support the roof of a veranda or porch.

suddenly the road ends almost on the brink of a mighty chasm, a gash in nature's face, mute evidence of her warfare with the elements.

Nobody tells us to stop our horses. The action is absolutely automatic. We even pull the animals back a step or two lest they stub their toes and drop themselves and us—especially us—over the edge along which they make strong attempts to nibble at a vagrant spear of grass that hangs over the cliff. Whoever has ridden one of the mules down the Grand Canyon trail to the Colorado River in Arizona knows the feeling inspired by this act. It is essentially one of the best methods of developing goose pimples and ragged nerves known to civilized man.

We dismount and step gingerly to the edge of the cliff and stand there entranced, for we are looking down into a gorge cut hundreds of feet deep into the solid rock, the far side nearly a mile distant. The wall beneath us is almost perpendicular while the opposite side slopes back at an angle of perhaps forty degrees. At the bottom the "Rito de los Frijoles," a Spanish phrase, which anglicized means just plain "Bean Creek," known to the ancients of the region as "Tyu-on-yi"—the treaty, the compact—threads its course through groves of cotton-

woods, alders and pines a rollicky little brooklet, an ideal trout stream but for the fact that a few miles below, it drops over a sheer precipice of almost a hundred feet up which no fish have ever found their way. Half hidden in a grove of trees just under us we catch glimpses of white tents, and the roof of a large stone house from the chimney of which the rising smoke speaks of the good cheer to be found in the home of the representative of the Forest Service who keeps watch and ward over this Pompeii of the New World.



A PRESENT DAY CEREMONIAL DANCE

The long lines of dancers swaying back and forth in their rhythmic posings.

one of the communal houses or buildings of which so many are found hereabouts and which, until it was excavated and cleared of the rubbish of centuries by the Santa Fe branch of the American Archaeological Society, was merely a huge shapeless mound.

A little to our right as we stand at the edge of the cliff the ranger points to what he calls the "jumping off

place." Here in a break of the canyon wall the Forest Service has built a safe and satisfactory trail down to the creek below. The men of the Forest Service dare to dream that some day an appreciative Congress will give them the money with which to construct a wide wagon road here down which teams and autos may pass with safety and ease.

Half a mile up the canyon from the bottom of the trail we find, under a group of pines, a delightful camping place with plenty of grass for the animals, wood for fires and ice cold water in the creek that babbles not ten feet from us. What more could one ask for in a camp?

That night the full moon crept quietly over the rim of the canyon lighting up inch by inch the wonderful walls where, hundreds of years ago, these dead and gone peoples dwelt in peace and contentment. As we sat about the campfire we tried to visualize the scenes in the long gone days when each of these rocky rooms had its tenant. The children played in the same moonlight that was now bathing every nook and corner of the canyon, dogs barked, the coyotes howled back their shrill defiance, and the fires glowed cheerfully as the women baked their thin sheets of corn bread or boiled the corn meal mush for the morrow's festivities just as the women of the pueblos in this region do today.

The campfire dies down, our white tent looks ghostly and uncanny in the deep shadows of the trees, half a dozen coyotes split the cool evening air with their "yap, yap, yap," and from down the canyon some lone wolf makes the night vocal with his long mournful howl, while the dogs at the camp below us bark their loudest at these skulkers of the forest.

How good the camp bed feels as we turn in, weary with the day's ride; we plan the morrow's trips of investigation—yawn—now who's that chopping wood at such an unearthly hour? Why can't these forest rangers wait till its morning to do such things? What; morn-

ing? Nonsense, surely not? But there's the sun peeping over the mountain above to prove the night has passed all too quickly. An hour later we are ready for the day's explorations.

One scarcely knows where to begin there are so many points of interest to see. Here is a scattered ruin that, by its debris, must have been five or six stories high in places, the building of which must have been a labor of no mean proportions. There thousands of rooms have

been bored into the rocky walls, some of them ten or twelve feet square, and, if the theories of those who have studied it are correct—and everything indicates they are—some of the rooms must have been used in a series of stories one above the other and reached by log ladders. A line of small holes, each about six inches in diameter, and bored into the rock perhaps a foot which runs above many of these rooms is presumed to have been used by placing in each hole a long cedar or pine post which at its further end rested upon a cross pole supported at each end by a forked post set into the ground. This was then covered with grass and other materials on top of which earth was placed, thus forming a roof for one story and a floor for the other.

Most of the openings into these rooms are from three to four feet high by two and a half wide and often are carried back several feet before the room itself opens up. Sometimes there is a small room, a sort of alcove affair in the rear of the front or main room. The floors are smooth and

often leveled up with a mud plaster almost like cement in its hardness, and some of the walls are plastered with the same material. In many there are small holes or openings leading to the outside, undoubtedly smoke holes and for ventilatoin. Some of the rooms are badly smoked while others show no signs of fires ever having been built inside them. On the sides of many, small holes have been bored into which no doubt poles were placed upon which their clothing and other household furnishings were hung as one sees them today in every pueblo



SOME OF THE ROOMS WERE WALLED IN FRONT AS THIS ONE HAS BEEN RESTORED

Within this room a well-known American authoress wrote one of her most interesting books.



dwelling room. Just how the poles were placed in the holes is not clear unless they were sprung in while green and flexible. In several we found holes placed at such points as to make quite certain they were used to hold the poles that supported the rude looms or weaving frames of the blanket weavers as the Navajo squaws now suspend the upper pole of their looms between two forked posts set in the ground. On the walls of many were small niches perhaps a foot high and six or eight inches deep into the rock used doubtless for holding the ceremonial prayer meal, or some of the many household deities, "Katcinas" the present day pueblos hold so dear.

Possibly some of these rooms were used for store rooms while the family lived in the masonry built houses in the canyon below. Often these were built right against the wall of the canyon in front of the room so the family stepped direct from the excavated rooms into the masonry ones outside.

Some of the cave rooms are decorated with rude colored drawings of animals, men, birds and odd geometrical designs. Some thus decorated may have been and doubtless were used for ceremonial purposes. One large room is decorated with a huge serpent, the "plumed serpent" of the Pueblo Indians many of whom, especially the Hopi, believe the people of this earth sprang from the union of the "Snake woman" of their mythical life and a pueblo youth.

Toward the head of the valley there is a wonderful ceremonial cave located in a large natural amphitheatre in the solid rock perhaps two hundred feet above the floor of the valley. For years it lay undiscovered, being finally located by some one from the opposite side of the canyon.

The cave itself is very large, being more than a hundred feet long and sixty or more high in front, sloping back to about eight or ten feet at the rear.

In the center of the cave or amphitheatre is a "Kiva" (Kee-vah) or ceremonial chamber which has been cleared

of the debris of ages and carefully restored to its original condition. The restoration consisted more of clearing out the rubbish than of rebuilding, for excepting the new roof of heavy cedar logs, the room now is practically the same as it was the day these dead and gone people used it for the last time. The walls were originally plastered with mud smoothed down by the hands of its builders, and you can see the very fingerprints and almost the "life lines" of their palms in the plaster,

so fresh and clear it is difficult to believe it was not done yesterday.

There is more or less ornamentation on the walls the colors of which are bright and unfaded after the ages they have been there. On the sides are the usual niches found in kivas of today at Taos, Cochiti, Zuni and other modern pueblos. In the center of the roof a small hatchway about two and one-half feet square gives entrance to the room below. The long slim ladder poles rise above the roof just as they once did and one can easily picture the scene in the olden times when the mystical ceremonies took place and the totem of the clan occupying it swung from the end of the ladder poles warning all outsiders to keep their distance.

You see the long lines of dancers swaying back and forth in their rhythmic posing, the cave lit by the great fires that flung their ruddy glow far out into the dark of the canyon below while the sacred drum, formed of a huge pottery olla, its mouth covered with a deer skin, sent its boomings reverberating back and forth between the enclosing walls of the canyon. Thanks to the labors of the Anthropological Society of Santa Fe these restorations have been done by those who loved their work, and done well. Here each year come members and their friends to camp for days amid such interesting surroundings. Lectures are given, papers read, other ruins of which there are an unending number, opened up and explored and every one has the time of their life. Again the full moon moves majestically out from the



A REST AFTER A STEEP CLIMB

Just outside of one of the thousands of rooms in the rocky walls. The small hole above the door was evidently a smoke hole or for ventilation.

cliffs above and lights up the canyon. A coyote sends his long shrill cry from above to be answered by its mate in the canyon below. The camp fire burns low, the river gossips and gurgles over its stony bed and snuggled down in our blankets we dream the valley is once again teeming with those people of the long ago, the women pass back and forth from the stream carrying on their heads the ollas full of water, climbing the long ladders without touching their hands to them or spilling a drop of their contents. The men tend the corn fields or gather fire wood from the mesa above, while everywhere the children romp and play as only the pueblo children can, for of all children those of the pueblos in this region are the happiest.

In our dreams we hear the voice of the village crier calling the people to their daily tasks exactly as he does each morning at Taos, Walpi and other inhabited pueblos and wake to find the first grey signs of approaching day tinging the tips of the canyon walls. The crier we heard was the camp cook.

By ten o'clock we are packed up and climbing out on the far side of the canyon up a more reasonable trail than that we used coming down on the other side, bound for the place where rest the sacred "Lions of Cochiti," two remarkable carved figures of whose origin or the true

purpose for which they were carved no one really knows beyond the mere assumption that they were used in some of the olden time ceremonies by the forefathers of the present inhabitants of the nearby pueblo of Cochiti (Co-che-tee). Through a wonderfully beautiful stretch of yellow pine timber open and clear of underbrush as

some city park, we ride for several miles then drop into a deep canyon only to climb out again and into another still deeper.

More climbing and we are at the place where rest the stone lions. Here amid cedar, pinon and scattered pines through which are dozens of ruins both large and small, these remarkable objects rest in the center of a circle of huge stones set up on end as if for a fence, a narrow lane leading out from it also fenced with stones. This lane or entrance is about fifteen feet long and three wide and faces towards the south. Unfortunately some vandal hands have destroyed parts of the lions, but there



TOWARD THE HEAD OF THE VALLEY IS A WONDERFUL CEREMONIAL CAVE LOCATED IN A LARGE NATURAL AMPHITHEATER

For years this cave lay undiscovered until located from across the canon. In its center is the "Kiva." Note the ladders placed for reaching the cave.

is still enough of them left to show their general form and shape. They lie side by side carved from huge boulders lying deep in the ground, two great mountain lions, their heads upon their fore legs spread before them, their long tails lying straight out behind, as if posed for a spring at some enemy. From all that can be learned from the Cochiti Indians, whose village lies



A HIGH AND STEEP CLIMB

One of the ladders by means of which the Ceremonial Cave is reached.

about fifteen miles below in the valley, these lions were carved by their people and represented a shrine to which they came year after year to hold some of their peculiar and interesting ceremonies. Among all the pueblos the mountain lion is the symbol of one of their secret cults or clans and doubtless these carved lions were peculiarly sacred to the ancients.

For some unknown reason these ceremonies are not now celebrated at the Lions' shrine and the place is seldom visited by the Cochitis unless as guides to people desiring to see them.

Ten miles further down the canyon is the well known "painted cave," "El Cuervi pintada" of the Spanish, a huge natural amphitheatre high up on the walls of the canyon. On the rear wall of the cave are many odd designs in colors, some red, some blue and others black. Most of them are very old and were there when the cave was first visited by early explorers centuries ago. Others are frankly modern, the work of thoughtless tourists and some done no doubt by the Indians them-

selves within the last decade. Here as elsewhere the vandal has done his work and one finds emblems of secret societies, initials of visitors, and such wretched evidences of man's thoughtlessness and lack of decency all over the walls of the cave. Since the forest rangers have been in charge of the region, however, such work has been stopped and they tell with great joy of one visitor who cut his name and address deep into the stone wall only to be overhauled and brought back by the ranger and forced to erase the whole matter by rubbing it with a hard stone until not a single trace of his self advertising scheme was visible. The cliff being almost perpendicular you must be almost a lizard to reach the shelf above, shallow "toe holds" cut into the rock offering a very precarious footing. One of the more adventurous of the party however climbed up taking with him a long rope which when looped over a handy projecting point of rock enabled the rest to scramble up in comparative safety.

The ladies, however, declared they could see all that was worth seeing from the ground and while we were examining the cave they went searching for arrow heads,



THE RESTORED "KIVA" IN THE CEREMONIAL CAVE

The heart of the Ceremonial Chamber cleared of the debris of ages and carefully restored to its original condition.



quantities of which are found all over the region. Shrieks of terror from them brought us to the edge to see both perched upon the very highest boulder around, skirts gathered about them and squalling "snakes, snakes," at the top of their voices. Incidentally the rock they climbed had neither "toe holds" nor rope, but they reached the tip top with little delay, just how, they were unable to say. We descended from the cave in much less time than it took to get up, finding a rather large sized diamond backed rattler comfortably coiled a few feet from the rock, rattling his caudal appendage just often and loud enough to make certain the women would stay there to the end of time rather than try to escape. A piece of cord formed into a lasso soon caught the noisy gentleman and we went back to camp that night with several of his pictures in our camera and his rattles ornamenting the hatband of one of the ladies.

Lest this be considered a sign that such incidents are of frequent occurrence let me hasten to say that this snake was the only one we saw in this region during a fifteen days' trip.

Naturally the first question that comes to one's lips is: Who were the builders of these ancient dwelling places, where did they come from, where did they go, and of equal importance, how old are they?

As to the first question, ethnologists and students of the subject agree that they were the forefathers of the present pueblo Indians such as the Hopi, the Acomas,

Zuni and other native peoples now living in the region occupied by the ruins which is roughly all of northern Arizona and New Mexico and southwestern Colorado. All the legends and folk lore of the present day pueblos tell of the ancients who formerly lived here and peopled these deserted homes. Further than this the excavating that has been done all through this region clear down into southern Arizona, near Phoenix, has discovered plenty

of evidence to substantiate this claim in the shape of totems, symbols, pottery and other "relics" that connect the present with the past in such a convincing manner as to fully justify the statement that the present pueblo Indians are of practically the same stock as the people who built these wonderful ruined dwelling places, although through infusion of other blood there have been characteristic changes in type.

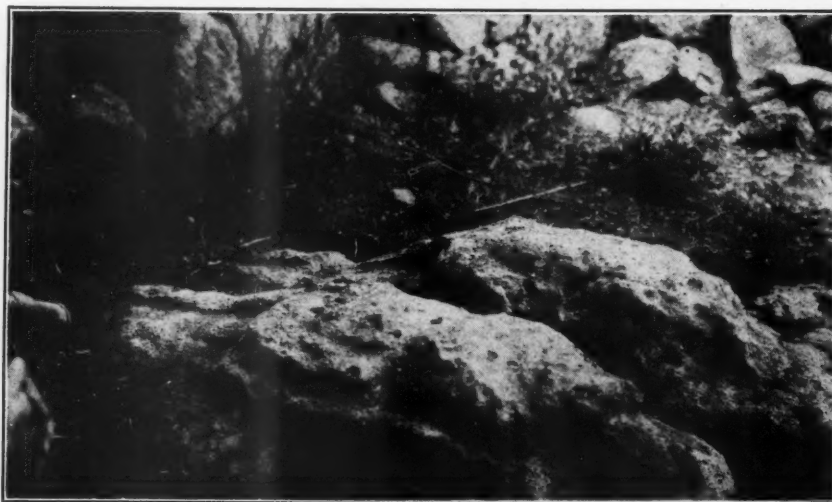
Where did they come from? Doubtless from the northwest. Many attempts have been made to connect them with the Aztecs and Toltects of Central

and South America but there is little upon which to base such belief. Most difficult of all is to reach some conclusion as to where they went when they left; and why. Was it war, pestilence or some wholesale migration that caused them to leave these homes built with so much labor? Pestilence it could not have been, else there would have been more evidences of their burial places. So dense a population as existed must have had many



THE APPROACH

This shows the roughly walled entrance lane to the circle in which lie the "Stone Lions."



THE STONE "LIONS OF COCHITI"

They lie side by side, carved from a huge boulder lying deep in the ground. Vandal hands have destroyed parts of them.

deaths from natural causes, yet but comparatively few bodies have been discovered in the neighborhood of the largest ruins. Some of the bodies found have been rudely embalmed or at least an attempt seems to have been made to preserve them from decay, and burial within the rooms seems to have been practiced to a limited extent. As for cremation, there is little or no evidence



BEAUTIFUL, BUT HORRIBLE TO BEHOLD

A piece of cord caught the noisy gentleman, but not until he had given the feminine members of our party a good scare.

that this was practiced. That they were the prey of other and more warlike tribes is quite certain, but there seems to be no positive proof that they migrated to any distance. The most satisfactory theory on this subject is that these ruins were not all occupied at one time but were built and used for a period of years, then deserted for some peculiar reason, either by whole villages or separate families who moved out from the old homes and built others perhaps immediately adjoining them or at some distance. This is more or less substantiated by the actions of the pueblos of today for at Hopi, Zuni, Taos and other inhabited villages one can see similar changes and moves taking place each year.

Near the Hopi villages in northern Arizona Doctor Fewkes, of the National Museum, unearthed from a huge mountain of drifting sand a complete village, obtaining the hint as to its presence from the old men at Walpi, one of the Hopi towns, who told him their legends mentioned the covered city as having been occupied at the time the Spanish visited the region between 1542 and 1543. They even had a name for this lost city although it must have been completely buried for at least two centuries. This is true also of hundreds of other

buried towns all over the region, the legends of the pueblos furnishing names for almost all of them.

Thus it comes that while the numbers of persons living in some of these towns must have been large, it does not follow that all the rooms in each ruin were occupied at the same time or that the total population can be estimated on the basis of the number of rooms or dwellings. Following this theory to its logical conclusion we may believe that after a certain group of buildings had been used for many years, the inhabitants for some unknown reason migrated to another site and there started a new city which eventually went through the same process of building and ultimate abandonment. Perhaps some scourge carried off numbers of the people and they



THE STEEP ASCENT TO THE PAINTED CAVE

One had almost to be a lizard to negotiate the steep face of the rough, rocky cliff and reach the cave.

vacated the town just as the Navajos who have always divided this country with the Pueblos, do at the present time, for they at once desert the family "Hogan" no matter how well built and comfortable, when any member of the family dies in it, and, moving off to some distance, erect a new one. Let lightning strike a tree under which a Navajo hogan stands and it is at once vacated and

thereafter shunned as a "bechindy hogan" (haunted house). Nowhere in the west is lightning more common and destructive than in this region, and doubtless the ancients had the same fears of it the Navajos now have.

As for their age, who shall say how old they really are. Here for instance is a group of houses the walls of which are six or eight feet high, the debris about them indicating at least three stories. In the center of the mass of rubbish that has engulfed the whole village stands a yellow pine tree not less than three hundred years old. When Coronado and his army of "Conquistadores" marched through this region in the years between 1542 and 45 many of these ruins were noted looking just as old, mysterious and "ruiny" as today. Thus far back we have historic evidence of their age.

It is easy to imagine their builders were living in them when Columbus set sail for the unknown west. Perhaps the women, who are the home builders of the pueblos, were carrying the stones and mortar with which to build these houses, up the long ladders or steep trails at the very time when Alfred the

Bible that it is—may we not in reason believe that the people who built some of the abandoned cities and dwelling places were living in them the very night the Shepherds saw the star in the east? Maphap from some



A GROUP OF CO-CHI-TI BOYS AT THE GREEN CORN DANCE

The boys are taken into the several "clans" very early in life and take part in the ceremonies with as deep reverence and dressed exactly as their elders. Of all children, those of the Pueblos are the happiest.

of the watch towers which are located on almost every prominent point along the deep canyons, and on top of the highest buttes with which the whole country abounds, the "lookouts" of these lost peoples also saw the star of Bethlehem and wondered at its beauty.

From all the information so far developed by a study of these ruins and the material unearthed in them, their builders were a peaceful, agricultural folk, depending for their sustenance upon their fields of corn, beans, melons and such products as they knew in those days, while for meat they had the game animals such as deer, antelope, turkeys and rabbits which abounded in the region.

From all the signs they probably lived at first along the streams and in the large valleys where today their irrigation ditches can be traced for miles as they worked their devious ways from the watercourses to the often distant fields. These ditches were laid out with such

excellent engineering ability that after centuries of disuse the American settlers have, in many instances, utilized them for their own irrigation purposes. After living in the lower country for perhaps centuries they may have been forced back by some aggressive and war-



THE WEIRD LOOKING "PAINTED CAVE"

Ten miles down the canon is the "Cueros Pintada"—the Painted Cave. A huge natural amphitheater, high up on the canon's wall.

Great was harrying the Danes in the North seas.

The Mormon people believe the ten lost tribes of Israel were the progenitors of the western Indians. Accepting this belief of the Mormons as plausible—and any Mormon missionary will soon convince you by the



like race, to the higher and more inaccessible regions where they built those huge communal dwellings some of them with hundreds of rooms, built in solid squares often running up several stories with few or no entrances on the ground but entered mostly by ladders through roof openings like ship hatchways.

Probably in time these failed to give them the needed security and they migrated once more into the deep almost inaccessible canyons where they built those wonderful aerial cities tied to the precipitous sides of the cliffs more like swallows' nests than human habitations, hundreds of feet above the floor of the canyons. There is a possibility they used all these several places of residence more than once returning to the open areas when the pressure from their enemies was lessened or ceased.

A very old Apache Indian once told how his people lived for several years in a series of large and apparently very old cliff dwellings on the lower Tonto Creek in Arizona. Here in these secure retreats the Apaches took refuge from raids upon them by other Indians returning to their usual habitations along the streams when the danger had passed.

That these ancient people grew cotton of some kind is proved by the fact that coarse cotton cloth of very good weave is often found wrapped about the dessicated remains of their dead found in some of the ruins and in protected places under overhanging cliffs where they were not reached by rain or other moisture. Of domestic animals they seem to have had none. The wild turkey they may have domesticated in a way, for its bones are found in the waste heaps about most of the ruins and they probably captured eagles and confined them in rude cages in the village just as do the Pueblos of today.

To the average sightseer these ruins are all classed under the one general term "cliff dwelling," and their builders "cliff dwellers," which is probably as satisfactory a name for them as can be found.

When one remembers that every bit of food, water, firewood and other material used for domestic purposes, even the stones and mortar for constructing the buildings themselves, including the huge rafters formed from tree trunks, "vigas" the Spanish call them, had to be carried up these steep trails where today one must pick their way carefully lest a false step drops them into the depths

below, we are impressed with the position of a people so hard pressed as to make their homes in such places.

Once a young boy, visiting for the first time one of these swallows' nests high up in the side of the cliff, looked down into the canyon below and remarked solemnly, "Oh mother, just imagine being a little boy here and somebody saying, 'Jimmie, run down and get an olla of water for mother, hurry, child.'"

Of all the ruins they have left us to explore the cliff dwellings are by far the best preserved and most complete because of their location, where in this arid region the effect of the elements has been almost negative and there is little or no change from their original condition.

Of 'Cliff' or 'Cavate' dwellings there are two distinct types. The usual form of cliff dwellings is a natural open cave or shelf formed generally by wind and weather working upon the comparatively soft stone

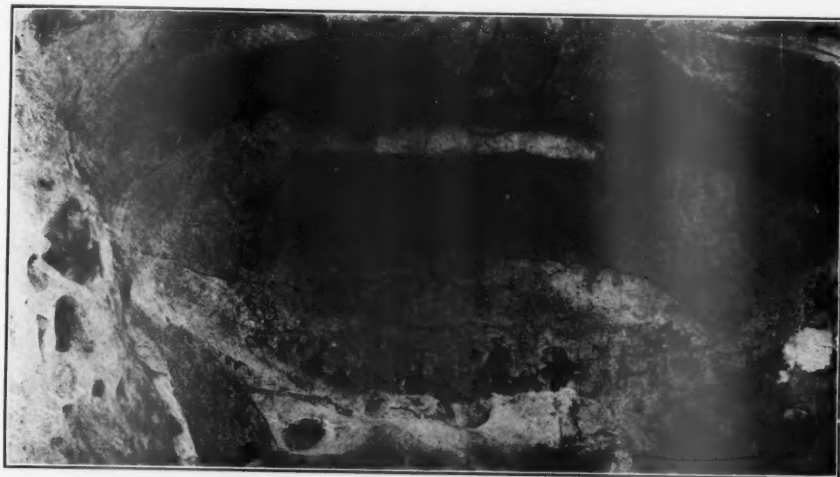
until an open space has been created of some size.

Some of these, like the huge shelf upon which was built the great "Palace" of the Mesa Verde ruins in southwestern Colorado, are very large, the palace being a city in itself. Others are merely one room affairs. In some the build-

ers simply erected a wall along the front of the shelf or ledge and the house was done; in others, they built regular rooms with doors and windows.

The Cavate dwellings are a type rather peculiar to the Bandelier Monument region and are almost wholly man made, the formation being known as "Tufa," or volcanic rock and very easily worked. With this material at hand the ancient builders using a piece of "Mal-pais" or other hard rock for a tool with comparatively little labor bored or excavated into the walls of the canyons, rooms which made admirable homes, warm in winter, cool in summer and easily defended against the enemies of those days.

The third is the "Pueblo" or communal type of dwelling and all over the Bandelier monument may be seen some of the finest of this class. The word "Pueblo" is Spanish, meaning town or village, and was given these Indians when the Spaniards first came in contact with them at Zuni, Acoma and other modern pueblos. No ruins in America? Here are ruins by the hundreds scattered over the country so thickly that you can ride all day long and scarcely be out of sight of them. As for



ANOTHER VIEW OF THE PAINTED CAVE

The odd designs on the walls of the cave are in many colors, red, blue and black.

exploring them, there has been so little done that the field is practically untouched. If of a scientific turn permission can be secured from the government to explore and excavate some of them under certain reasonable restrictions. If merely a passerby you can find arrowheads of flint, obsidian and petrified wood scattered about with apparently prodigal hand while pieces of rare pottery, bone ornaments, specimens of turquoise the prized jewel of these people, stone metates or grinding stones, small bone and shell images of frogs and other animals are frequently picked up after heavy rains or found in the loose debris formed of the dust and refuse of ages lying deep on the floors of so many of the houses. Nor is the Canyon de los Frijoles the only one of interest. A few miles north is the great pueblo ruin of Otowi (Ot-o-we) containing over 700 rooms and possessed of no less than ten large circular underground kivas. Here also is the wonderful "Tent city of Otowi" the peculiar conical tent like formation of tufa containing hundreds of caves, natural and artificial, many having been used as dwelling places.

Not far from Otowi is the ancient pueblo ruin of "Puye" (Pui-yea), "the place of cottontail rabbits." Here on top of a large mesa or table land standing boldly out in the midst of a fairly open country, they built a pueblo of worked tufa rock, quarried from the nearby cliffs, a most unusual type of pueblo construction, while the face of the cliff or mesa below is, for half a mile or

more, fairly honey-combed with cavate rooms bored into it. In this the porch idea has been used extensively, almost every room having the row of holes above it indicating a porch attachment. Besides these individual groups there is to be found on every mesa and in every canyon, large and small throughout the monument region, similar ruins in endless and interesting profusion.

Here then, in this new-old Bandelier National Monument, named for one of the world's greatest ethnologists and archaeologists, who devoted his whole life to a study of the Pueblo and his habitations both ancient and modern, the seeker after ruins peculiarly American can find them to his or her hearts content.

The area contains about thirty thousand acres of practically uninhabited country, covered for the greater part by a fine stand of yellow pine timber, gashed by deep canyons, and fairly well watered. Within its boundaries are types of pueblo ruins not found elsewhere and on no other part of the southwest can they be seen in such numbers and in such close proximity to each other.

As for camping places, during the summer months the Monument has endless charming spots where beneath the fragrant pines and close to springs and clear running streams the tourist may camp at his pleasure in a climate unsurpassed in the world for outdoor life, bracing, invigorating and health-giving. Try it next summer for that tired feeling.

## THE PRESENT AND PROSPECTIVE IN FORESTRY

(Continued from page 550)

ber famine most serious is unavoidable. The second and third are matters of investment and persistent effort costing hundreds of millions of dollars and many decades of time. In this regulation of the existing woods we may well follow the Old World and say:

Keep a forest on the land.

Never devastate, never cut large areas of forest bare; never cut, say, over *one-third* of what there is *now upon* the land, and never return to the same area with your cut in less than twenty years.

It might be interesting to follow this suggestion or plan and see where it leads; suffice it to say that if inaugurated

at once we would still have a deficit of over two hundred billion cubic feet at the end of the first twenty years, nearly two hundred billion deficit at the end of second 20 years, and the *growth would not catch up with our cut* before the end of this century.

The matter is serious, and all this talk of optional measures, sectional and state action, all see-saw and compromise, and all talk of more study, more experiments, more learning in silviculture, all these things, are of no avail, they merely delay, they assure continued devastation, aggravate the timber famine already started, and defer by decades the proper rebuilding of our forests.

## THE PINES OF THE SOUTH

(Continued from page 558)

trial development of many civilized countries. Enormous quantities of lumber have been harvested from these trees, and yet in spite of the heavy cutting which has been going on for many years they still produce more than one-third of the total lumber cut of the entire country. But expert lumbermen and foresters predict that the major supply of southern pine lumber will be cut off in the next 10 or 15 years. It is now evident that

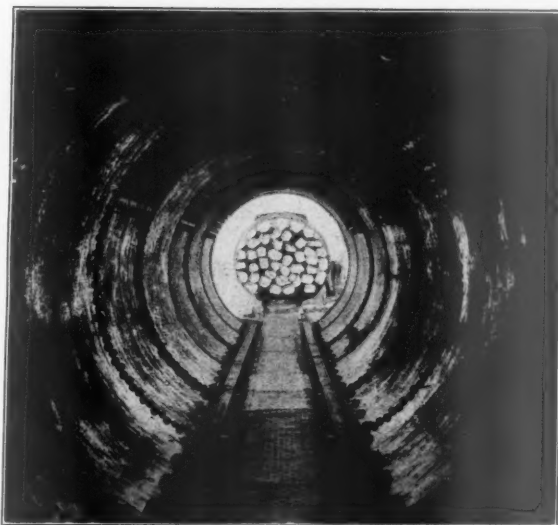
the present supply will be exhausted before long, and in order that the lumber industry may maintain itself, it is necessary that special efforts be put forth to protect the pine forest of the South from fire and to restore a forest growth upon the many thousand acres of barren forest land now loafing in all parts of the southern pineries.

# HOME BUILDING AND WOOD PRESERVATIVES

BY ARTHUR NEWTON PACK

THE United States needs a million more homes, each one of which will be called upon to do duty for at least one generation and perhaps for several generations in addition, and our farmers need a million more farm buildings, as our agricultural communities are surprisingly underbuilt. There is often too little thought for the repair bills of the future, but most of us honestly want our home to be as well built and enduring as possible. Some who can afford the expense will build with stone, brick, hollow tile or cement, but our forefathers built houses of wood which still stand to-day, and wood seems destined to remain the choice of most home builders for present and future.

The man who puts up a building that will endure really performs a double service, first to himself and, second, through conservation of our timber resources, to the country at large. The importance of combating waste and decay is generally appreciated, yet it is estimated that the people of the United States throw away a hundred million dollars a year in preventable decay of wood alone. The use of preservatives which prolong the life of wood used in home building is no new idea. It is not merely for appearance that we paint the outside of our houses or stain the shingles on our roofs. Paint, however, is merely a protective coating for the surface which must be frequently renewed. It does not kill the vegetable organisms of decay. The true preservative may be advantageously used on sills, door-steps, porch and stable floors and supports,



INSIDE A PRESSURE TREATING CYLINDER

This is the method of applying wood preservatives used by practically all the large commercial companies.

ject to rot and may be *profitably* treated with preservative. The decay of wood is caused by living vegetable organisms known as fungi. The microscopic seeds or spores of these wood destroyers are produced in countless numbers from the mushrooms or mold-like growth which appears on rotten wood. Being easily disseminated

by the wind they are present everywhere, and decay which seems to spring up spontaneously really only occurs where the spores have found favorable conditions of heat and moisture in which to develop. They start their destructive work wherever wood is moist and especially where it is in contact with the ground, or with walls and foundations. Accordingly a good wood preservative must be sufficiently toxic or poisonous to the spores of the fungi to destroy them, and at the same time sufficiently permanent to continue performing this function. It must also be readily absorbed by the wood, cheap enough for general



WHERE WOOD PRESERVATIVES SHOULD BE USED

Porch steps such as these could easily have been made to last as long as the rest of the house and at an expense much less than the renewal cost.



use, easily handled and applied, and not poisonous to man or animal. Many things have been tried as wood preservatives, the list ranging from common salt to skimmed milk, and it is certain that experiments have included several hundred materials. Of these, however, probably not over twenty-five have in laboratory tests been found to be really effective in checking or destroying the growth of fungi, and of this number only three



BRUSH TREATMENT PROCESS

Applying refined creosote to telegraph poles and the same method may be used for all farm lumber.

or four are of recognized value for general commercial use.

The best general preservative developed is coal tar creosote, since it combines in greatest degree the essentials called for. It is a by-product of coal tar, from which so many materials, including dyes, drugs, perfumes, flavoring extracts, etc., are obtained. Creosote is, in fact, a by-product of a by-product, since coal tar itself is a by-product of coke ovens or illuminating gas plants. It is a heavy dark brown liquid which in turn is composed of many chemicals, including naphthalene, which is the common constituent of moth balls, and anthracene, which is of high toxic value. Commercial creosote is of various grades, ranging from that which is left over from the distillation of coal tar to that which has been refined by removing some of the lighter boiling fractions. This means that the oils or products which would evaporate most quickly have been removed, leaving a material which in viscosity and permanence is especially suited for brush or open tank treatment of wood. Another creosote product is derived from so-called water-gas tar, this being in part a petroleum product usually obtained from illuminating gas plants. Other materials with a creosote base or to which other products have been added are sold under various trade names. A few of these have a high preservative value and may be used to advantage.

Another form of creosote is derived from wood tar which is obtained in the destructive distillation of hard woods. This is of materially different chemical composition, and while it has some preservative value, it has not been generally adopted or used for wood preservation.

An entirely separate and distinct group of wood preservatives is made up of various mineral salts, these including sodium fluoride, chlorides, creosole, calcium, copper sulphate and zinc chloride. The last is extensively used in regions of low rainfall, or where the timber is not in direct contact with moisture, and both alone and in combination with creosote has been extensively applied for the preservative treatment of railroad cross-ties in the Middle West. Zinc chloride comes in the form of a crystallized salt, which is dissolved in water and injected into the wood in about a three to five per cent solution.

Of the various preservatives available the best for the home builder, who must treat his wood with a brush or by hot or cold baths in open tanks, is creosote, and of the several grades and kinds the highest boiling oils, by which



BASE OF PILLAR ROTTING

The use of a wood preservative will prevent such decay as is frequently seen in cases such as this one.

is meant those which will show the least loss in evaporation, are best.

The best method of applying preservatives to timber is by the pressure process which is used by practically all large commercial companies. By this means the oil or mineral salt is forced deeply into the tissues of the wood, thus giving a thoroughness and permanence not otherwise attainable. There are various processes, but all use large and expensive apparatus by which vacuums and heavy pressure may be applied in large treating cylinders, which are usually six feet or more in diameter and a hundred feet or more in length. Many of the large railroad companies have their own pressure treating plants, while commercial plants of the same character are located in various parts of the country; especially at or near seaports, which are the most advantageous points for receiving and distributing both creosote oil and lumber.

The small consumer is likely to find difficulty in obtaining pressure treated timber for his needs, with the

exception of fence posts, and therefore must resort to the open tank or brush methods of treatment. The former consists in dipping or otherwise immersing the wood in open tanks containing the preservatives, and allowing it to remain from a few minutes to several hours, according to its condition and the kind of wood. By the use of alternating hot and cold baths, either by removing the timber from the hot bath to the cold, or by allowing the hot solution to cool to air temperature, a much greater penetration is obtained than if a hot solution alone is used. Detailed information on the kind of tanks to build and use, and the various steps in the open tank treatment are obtainable from publications of the United States Forest Service at Washington, and from the circulars of companies which sell preservatives. Whatever the instructions given or the processes used, it is very essential that the wood be thoroughly air seasoned before treatment.

The brush treatment is in effect a thorough painting of the wood with hot creosote, which should be applied with a large brush and in liberal amounts so that all cracks and openings may be filled and the outer surface impregnated to the full limit of absorption. It is often advisable to apply two or more coats, allowing the first to dry before the others are applied. The life of inferior timbers, which decay quickly, can be increased to equal or exceed that of more durable species untreated. But no treatment will be effective on rotten or defective timber and it will not hide or cure defects.

Preservatives have no appreciable effect on the strength of wood, and posts, sills and similar timbers may be used the same as if untreated. The exception is found in the case of pressure treatment where the wood is given a steaming process at high temperature in order to remove the sap, but this would not be encountered by the home builder.

Creosote will burn, but after it is dried into the wood, a stick will not ignite any more readily than if untreated; in fact, tests on thoroughly treated structural timbers indicate that while it will burn with a hot flame and a heavy smoke, it chars more quickly and is less likely to burn entirely through than if untreated. Mineral salts, on the other hand, have very distinct fire resisting qualities, and thereby serve a double function.

Light-colored paints cannot be applied over the surface of creosoted wood, but creosote itself gives an attractive brown stain, and for barns and other buildings of similar character, it takes the place of paint. As a matter of fact, the timbers around the usual home which are mostly in need of treatment, such as sills, the under side of porch flooring, the foundation timbers, etc., are not visible, and can be creosoted without detriment to the appearance of the structure. Creosote is distinctly valuable in checking insects, and is accordingly particularly useful for chicken houses or to guard pig pens against infection with hog cholera.

There is a very rapidly increasing use of preservatives on wood shingles, and the practice is to be highly com-



#### USES OF WOOD PRESERVATIVES

- Top—Treating fence posts by the open tank process, the posts being first shaved with a draw knife so the preservative easily penetrates the wood.
- Second—Lumber for sills and foundations being treated with refined creosote applied by a power spray.
- Third—In building a chicken coop the lumber is first treated with refined creosote applied much like ordinary paint.
- Fourth—A barn stained with refined creosote—the result a handsome brown effect unaffected by rain or sun.

mended since it not only retards decay, but to a large extent reduces the tendency to curl and loosen, which is sometimes found in the cheaper grades. As creosote forms the basis of most shingle stains, the ordinary process of dipping or painting with the stain is quite satisfactory. There seems to be a good future in connection with the use of fire resistant shingle paints, which combine not only the preservative effect, but also a high degree of resistance to fire. Any good paint or stain will tend to prevent the formation of cups which, because they are inclined to catch and hold flying sparks or brands, become the worst hazard of a shingle roof; while paints contain large percentages of aluminum silicate having real fire resistant qualities. The Paint Manufacturers Association of the United

States supplies a shingle paint which is both preservative in effect and highly fire resistant.

The cost of a high-grade non-volatile coal tar creosote is somewhat high when purchased in small quantities, although, as a rule, it is less expensive than good paint, and for the particular purposes mentioned is of greater value. The cost of applying depends largely on the facilities at hand, and the apparatus used, the brush treatment, of course, being only the labor in applying. The builder could hardly afford to construct and use open tanks unless treating a considerable amount of lumber, but in some towns the retail lumber yards are operating tanks of this kind, and in farming sections it is often desirable to build and operate a co-operative open tank plant.

**I**N Vermont farmers the past few years have been setting out a yearly average of 500,000 forest tree seedlings. These are grown in the State nurseries.

**P**ERMITS to build camp fires are required in a number of California National forests this season. In the State of Washington the State Fire law covers this subject. The idea is growing.

Prior to the shutting off of imports in 1914 on account of the war, about half the creosote used was of domestic production and the other half imported. To-day a considerable quantity of European oil is again being brought in, but its increasing use abroad as fuel is restricting the supply, and consumers must depend more and more on home production. Creosote has always been entered duty free, and it would be very unfortunate if a tariff

was imposed at the present time, because the price is already much higher than a few years ago, and anything which adds to the cost will discourage its use and prevent that expansion which is so desirable in order to obtain greater life from the timber used. Wood preservatives play a very important part in the conservation of our forests, for not only do they permit the utilization of



TESTING FIRE RESISTANCE OF SHINGLES

These have been treated with preservative paints, and gasoline soaked waste sufficient to ignite an untreated shingle roof—results in these treated shingles being only slightly charred.

inferior grades of lumber which would otherwise be impractical, but it is obvious that if lumber can be made to give added life, the drain upon our diminishing forest resources will be by just that much reduced. It is estimated that eight billion feet of untreated structural timbers decay every year. If that whole amount were to be treated we would actually save about four billion feet of lumber every year. That is to say, it would render unnecessary the annual deforestation of some four hundred thousand acres of land. There could be no truer or more effective forest conservation, and every home builder who, by the use of preservatives, lengthens the life of his house or barn, performs an effective service to the cause of forestry.

**T**HE State of Ohio, through recent legislation, will join the ranks of those believing in the State entering the field of forest growing.—Forest Patrolman.

**T**HE Third Southern Forestry Congress recently held at Atlanta, Ga., urged Southern States to adopt adequate forest policies and that Government and States co-operate in making appropriations for fire protection.



# COMMON AMERICAN MUSHROOMS

BY DR. R. W. SHUFELDT, C. M. Z. S., ETC.

(WITH PHOTOGRAPHS BY THE AUTHOR)

EVERY sensible writer who undertakes to publish an article on mushrooms, generally starts by pointing out the great danger that attaches to the gathering and eating of mushrooms by people lacking the knowledge to enable them to distinguish the poisonous from the edible or harmless species. No warning is more necessary than this, as hundreds of persons have died from eating the poisonous varieties of our mushrooms or toadstools, as they are familiarly called. Nina L. Marshall, in her work, "The Mushroom Book," is no exception to this rule, as she says, almost at the very outstart, that "although for centuries it has been known that some fungi contain most virulent poisons, still, through ignorance of those points which distinguish the poisonous from the edible, frequent cases of poisoning occur in all classes of society. The mistakes resulting in death have been frequent

enough to inspire the timid with an overpowering dread of all fungi; while the damp and grewsome places in which many of them flourish have caused them to be despised by others."

Every word of this can be endorsed by the present writer; and inasmuch as the poisonous species of mushrooms met with in nature are numerous, and often closely resemble some of the harmless ones, one should be as certain of diagnosis of a harmless or edible species as knowing black from white, or arsenic from gunpowder.

When properly prepared, some of our mushrooms stand among the most delightful foods known; and when the forester is serving far from civilization, in a country where many species grow in plenty at certain seasons of the year, it is of great advantage to him to be able to gather, with certainty as to their non-poisonous quali-



FIG. 1—THE DEATH CUP OR DESTROYING ANGEL

This is the name by which the big toadstool in the center of the picture is known. It is a fine specimen of the *Amanita phalloides*, one of the most deadly fungi known, and is frequently mistaken for a mushroom and eaten with nearly always fatal results. Possibly the tall, more slender specimen to the right is also a death cup.



FIG. 3—BOLETUS AND PUFF BALLS

The middle specimen in the upper row is a fungus belonging to the genus boletus, several of which are comparatively safe as food. In fact, the edible boletus (*B. edulis*)—the cepe of France—formerly an imported product, is now largely grown in California. "Funnel-shaped fungi" are here well shown, together with good examples of Puff-balls, of which there are three in the foreground.



FIG. 4—BOLETUS AND BLUSHER

To the left is another small boletus, or one of the fleshy fungi. It is posed in such a way as to show the replacement of gills by the "tubes" in this genus, a specimen of the Orange Cap Boletus (*B. versipellis*), an edible species of this largely poisonous group. The lumpy fungus to the right is a "blusher" (*Amanita rubescens*) in a young stage; this is an edible species of a very dangerous genus.

ties, a mess of these delicious morsels for his morning or evening meal. But, mind you, "there's death in the cup," and, unless one is certain of the species beyond all doubt, it is decidedly better to stick to the regular camp fare and pass the mushrooms by.

Now that this caution has been set forth as strongly as words can make it, we may, with safety, undertake to describe the pleasure to be derived from a study of some of these curious little sentinels of the woods, and even point out the difference between the edible and non-edible ones.

Some time ago, or early in the autumn of 1919, the



FIG. 2—THE CORAL, AN AMERICAN FUNGI

Of all the American fungi known, none is handsomer or more attractive than the "Coral." In this cut are two different species of them, and surely they are well named. The uppermost specimen is the lavender-colored *Clavaria amethystina*; while below it, in the foreground, we have two examples of the Pale Yellow Coral Fungus (*C. flava*). Both kinds are edible and more or less esteemed as food.

writer and his wife gathered in a few hours over thirty different species of mushrooms and other fungi in a piece of woods adjoining the National Zoological Park, Washington, D. C.; the next day photographs were made, natural size, of nearly all of these. It was a remarkable year for mushrooms, and it was a marvelous sight to see so many kinds flourishing in so limited an area. Later, twenty-three of these photographs were submitted to Mrs. Flora W. Patterson, the Mycologist in Charge at the

Bureau of Plant Industry of the United States Department of Agriculture, who very kindly identified as many of the forms as she could. Where exact identification was not possible, it was the fault of the collector and photographer, who failed to note the colors at the time of collecting, or neglected to photograph or describe those parts so essential, in any species, to absolutely correct identification. One learns a whole lot in this way; so should the reader ever contemplate making a study of our fungi in general, and our toadstools and mushrooms in particular, it will be well to bear these facts in mind.



FIG. 5—THE DELICIOUS MOREL

For ages the fungus epicures have regarded the Morels of the Genus *Morchella* as being among the greatest favorites for the table; they are difficult to differentiate with certainty. This may be the *Morchella conica*, and probably is, as the cup is conical and broader than the stem. Most of the species of this genus may be used as food; but the collector should be very familiar with the specific characters of the various forms.

With respect to their photography, the specimens may be taken *in situ* in some instances, provided the method of photographing that class of subjects be strictly followed and the right sort of plates used. If possible, they should always be taken natural size. They may also be most satisfactorily photographed in the studio, and when one plans to do so, the specimens should be taken up with a broad trowel, placed in a suitable basket, shielded from



FIG. 7—THE YELLOW CLAVARIA

This beautiful and edible *Clavaria* was photographed *in situ* on a mossy bank in a cool woodland in the District of Columbia. It is of a pale yellow color with needle-like tips to its branches. Pale Yellow *Clavaria* (*C. flava*) is sometimes found to be nearly white.



FIG. 6—MORELS, NATURAL SIZE

The cap of this species is sometimes curved at its apex. Delicious Morels may be cooked in all sorts of ways, and they are most "delicious" in all of them. Farmers use them in pot-pies, but the epicure prefers his stuffed with chicken, anchovies, or veal.



the sun and wind, and an immediate record made in the field note-book of all the colors and their exact distribution on each specimen so collected. They must be photographed on the same day they are gathered, their natural surroundings being simulated as closely as possible. It may be said here that, with but few exceptions, all of the pictures here shown were so photographed, the exceptions having been secured as they occurred in nature.

These fungi grow in all sorts of places—in open meadows and pasture lands; along roadsides and water-courses; in many parts of open and shady woods; in deserted buildings where there is but little sunlight and no fresh air circulates; while, finally, many curious fungi grow on old logs, dying trees, and in numerous other

tats, they are invariably interesting—in a great many instances extremely beautiful. None of them can thrive except under certain conditions, as not only is their food peculiar, but they die if warmth and moisture are withdrawn. Consequently we find such species as puff-balls, brackets, and any or all of the so-called toadstools, thriving in various localities where not only their environment is favorable, but where there exist rich soils, as cattle pastures, or plenty of rotting timber and decaying leaves. It is upon such material that most fungi subsist; for, at variance with ordinary plant growths, fungi thrive on organic matter only, instead of on mineral or inorganic substances.

Plants, like every other living thing, die if not more

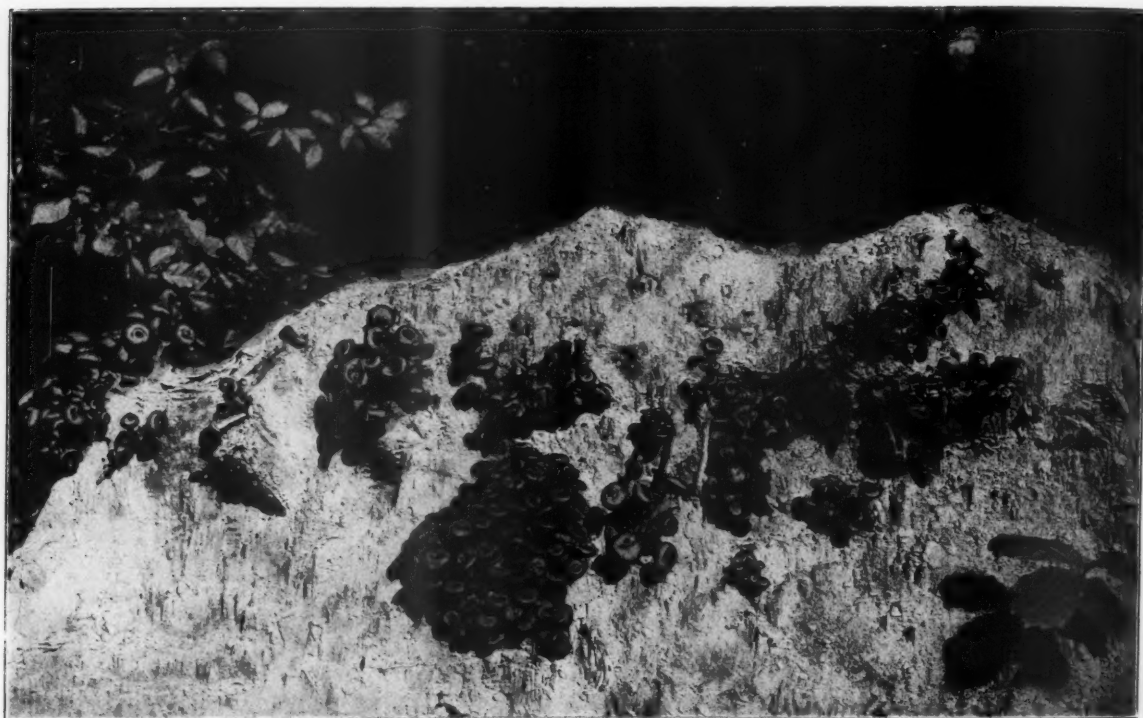


FIG. 8—FUNGI FATAL TO FOREST TREES

This wonderful group of deep, brilliant orange toadstools are seen to be growing on a bank of pale yellow clay, which is offset by the dark woods in the rear. (Much reduced.) They are *Armillaria mellea*, a parasitic fungus, most fatal to large forest trees. They spring in hundreds from the bark, and the doomed tree soon dies.

places. The species known to be edible are called mushrooms by most people, while all the suspected ones are designated as toadstools.

There is a long myth story as to how the "fairy-rings" are made upon our grass-plats and on grassy hillsides—the curious fungus *Oreades* killing the grass in circles; but, while it is a very pretty tale, and has been enlarged upon in various ways, it is too long to give our readers here. A writer at hand says that "such rings are conspicuous on the lawns of the White House at Washington, and are often to be seen well defined on distant hillsides."

There is a long list of fungi indigenous to this country; and when observed growing in their natural habi-

or less regularly supplied with such foods as are converted into anatomic structure after digestion and absorption. In the case of ordinary plants, their green leafage absorb the gases of oxygen and hydrogen from water, and carbon from the atmosphere, and these, through a certain process of plant physiology, are converted into compounds of sugar, wood, and starch. Thus it will be seen that dead mineral matter is, by certain green elements in leaves, converted into living substances, and nowhere else in nature do we meet with anything approaching such a transformation.

Now fungi subsist largely on foods furnished by elements produced by ordinary or green plants, no small

part of which are the dead leaves themselves. All fungi reproduce from minute spores, resembling the pollen of certain green-leaved plants, and these spores are entirely different structures as compared with true seeds. By careful examination, these fungi-spores will be found to exist in particular localities on the matured specimens of the various families and genera—all the way from brackets to common mold.

Most people who live in or go into the country, know a puff-ball when they see one; they know very well that when it is struck or stepped upon, it sends out a shower of fine, light brown or gray dust. Now this dust is made up of millions of puff-ball spores; and if they are ripe and fall in places presenting favorable conditions for their development and growth, they will, according to circumstances, produce a large number of young puff-balls.

The economics of the mushroom trade and con-

sumption, and the laws controlling the indiscriminate marketing of such products, in that fatal cases of mushroom poisoning may be reduced, are all large questions that need not be taken up in connection with the present article. The interest in all this has vastly increased since

the developments following upon some of the results of the World War. In one of his admirable articles, Prof. Louis C. C. Krieger has said that "to ask a person to gather his own mushrooms for the table, without previous instruction that will enable him to avoid the dead'y kinds, is equivalent to, if not worse than, inviting him to put his unprotected hand into a den of rattlesnakes. Indeed, of the two risky performances, the latter would be the safer; for there are at least two known antidotes for rattlesnake venom, whereas there is none for the poison or poisons of the exceedingly common *Amanita phalloides* and its multitudinous forms and varieties." The present



FIG. 9—THE FRUIT OF A PARASITE

An enlargement to about half the size of nature of the group seen to the extreme left in Figure 8. This fungus is nothing more or less than the fruit of a parasite; and when scraped off with a knife or other tool, are soon replaced by fresh groups of the same species. A fallen oak near where these grew had great patches of this fungus growing upon its bark; owing to their brilliant color they could be seen for a considerable distance through the woods, where there was nothing to obstruct the view.

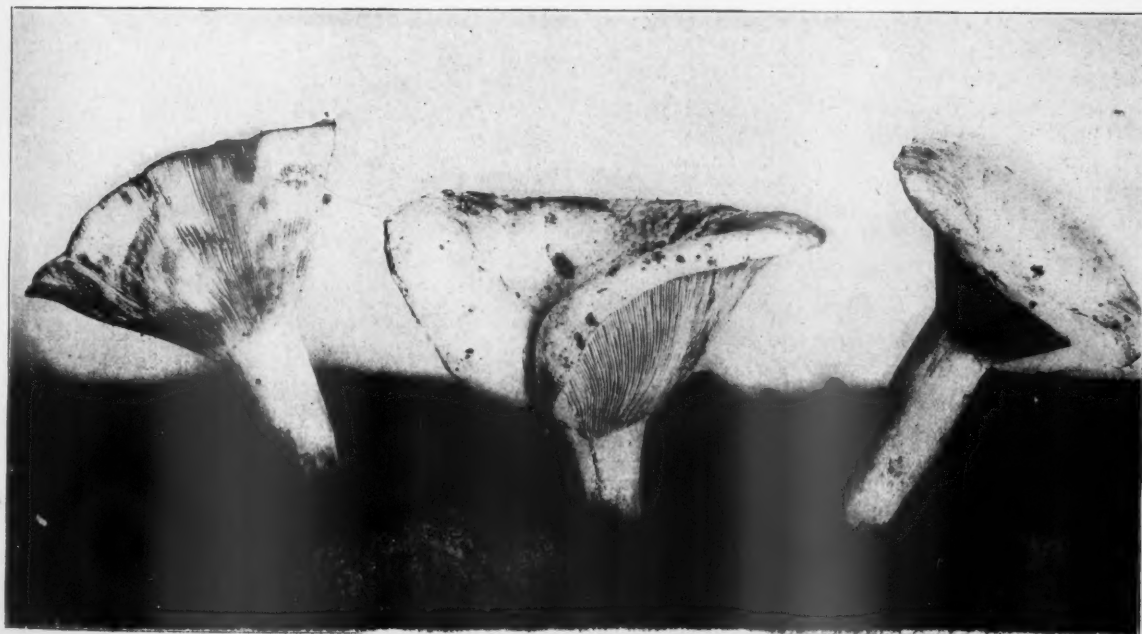


FIG. 10—THE PEPPERY LACTARIUS

A species not always easy to find. It is a typical funnel-shaped fungus, with a peppery taste and a slight aromatic odor. This fleshy, creamy-white toadstool is without a veil or annulus, but with a very short stem, and any part of it exudes a milky juice when cut or broken. It grows from 3 to 12 inches in height, the cap usually spread out; it is a midsummer variety.

writer's illustration of *Amanita phalloides* is here reproduced in Figure 1, where it occupies the central position.

Poisoning from the eating of this species is wonderfully rapid, and the death following it a most painful and horrible one. Some of the species of this genus are non-poisonous; but notwithstanding this, it is far better to be on the safe side, and let all amanitas, or "death cups" as they are called, alone. We find them growing, from April to October, or even later, according to latitude, in open, rich woods, and sometimes in cultivated pastures.

In studying mushrooms, one should first be familiar with the simple structures presented on the part of a typical specimen of an all-round variety. Now in the *Amanita* (Fig. 1), it must be noted that the plant primarily presents the *cap* or top part, and the *stem*, which is the fleshy rod supporting it. Beautiful, radiating plates, most delicate in structure, occupy the under side of the cap; these are known as the *gills*. Often, at the root or *base*, we find an enveloping cup, here well shown in Figure 1, in the *Amanita*, and it is called the *volva* or veil. It is not always present, nor are the gills to be found in all mushrooms. Note, too, in *Amanita*, below the cap, a curious, down-hanging structure, encircling the upper part of the stem. This is the *ring*, and its distance from the *pileus* or cap varies in different species when it is present, or even in different plants of the same species.

"Coral Fungi", which closely resemble some species of the smaller varieties of coral, are always extremely beautiful. Two species of these are shown in Figure 2, the two lower specimens being small examples of the yellow form (*Clavaria flava*), much enjoyed by epicures. The upper, lavender-colored one, is *Clavaria amethystina*. There are numerous species of this genus *Clavaria*, and the student-collector should carefully enter in a note-book, at the time of collecting, the color of any particular specimen; the character of the tips or apices of the branches; the taste and character of the spores, and, finally, in what sort of place it was found. When perfect, and growing in dark soil, in open, shady woods, these coral forms of *Clavaria* are most beautiful. In identifying mushrooms, the shape of the cap is extremely

important. When it spreads out like a flatish umbrella, slightly convex on its upper surface, with free gills below, its form is said to be *umbonate*. When it becomes *markedly* convex on its superior surface, we simply use that term to describe it, just as we say it is *expanded* when it is very broad and flatish. Finally, we have the funnel-form cap, which resembles a funnel with its spout passing into the stem. In Figure 3 the two funnel-shaped mushrooms are readily recognized, there being one on either side of the upper specimen of a *Boletus*. Three beautiful puff-balls (*Lycoperdon gemmatum*) are grouped in the lower right-hand corner of this figure. A great many different kinds of mushrooms

are grouped in the genus *Boletus*, referred to above; indeed, so long is our list of them that to even mention the forms by name would occupy altogether too much space in this connection; they belong to one of the groups of fungi that have *pores* instead of gills. On a vertical section of the cap of a *Boletus*, these pores appear like a lot of vertical little tubes, packed closely together, the whole forming a sort of dense, spongy mass. This is well seen in the small *Boletus* to the left in Figure 4. Besides the many books, monographs, and special illustrated articles that have appeared on these fungi with pores, are two very famous ones, the first being the New York State Museum Bulletin No. 8, of the year 1888, in which 110 species are described. It is entitled "Boleti of the United States," and, if not exhausted, may be purchased from the



FIG. 11—A TALL TOADSTOOL

This is a specimen of *Agarius silvicola*. Its gills are dark colored and its stipe or stem somewhat bulbous. (Half natural size) The collar of this specimen is pressed up against the stem. Most of the species, if not all, of this genus are edible. Nearly every variety of brown-spored toadstool with free gills is in this group.

State librarian at Albany, N. Y. Mr. Edmund Michael has also published, in German, his "Fuhrer fur Pilzfreunde," with nearly 70 colored plates. Our own Department of Agriculture at Washington has issued numerous works on this subject, as Bulletin 796, by Flora W. Patterson and Vera K. Charles on "Some Common Edible and Poisonous Mushrooms," and the Departmental Bulletin 175 on "Mushrooms and Other Common Fungi." Then Nina L. Marshall, in "The Mushroom Book," gives a list of writers on this subject at the close of her volume. She has an excellent chapter on these fungi with pores that should be carefully read by the student of mycology; it is too extensive to give more than this



reference to it here. After a little study it will be found that the group is not so very complicated, while some of the forms are beautifully colored and furnish elegant subjects for study.

No account of our mushrooms would be complete were no mention made of the famous Morels (Figs. 5 and 6), especially those constituting the genus *Morchella* of the family *Helvellaceæ*. All the species of this group are edible, and most highly esteemed by epicures and others; indeed, the Morels are prized above all other spore-sac fungi known to us. There are several genera of them, and no species are better known than the delicious morel, *M. deliciosa* and *M. esculenta*.

The writer has frequently observed these morels growing, in the month of May, in the woods in the neighborhood of Washington, D. C., and the specimens shown in the accompanying reproductions of photographs were collected there. Nina Marshall says of them that "all the species, when young, are of a buff yellow, tinged with

brown, but later they are darker. The stems are rather stout and hollow, white or whitish in some species, and attached to the cap at the apex only; but in others attached to the rim as well." Sometimes, in old orchards, after a shower in April, these morels will suddenly spring up in loose groups, the individual plants being a few feet apart, and each specimen from 2 to 6 inches high. There is no mistaking them for any of the poisonous species by an intelligent collector, and the time mentioned is the time to get them.

Sometimes we meet with mushrooms that are so brilliantly colored that, when growing in masses and nothing chances to be in the way to obstruct the view, they may be seen in the woods a long ways off. The intense deep orange species, here shown in Figures 8 and 9, is an excellent example of these. This particular fungus is harmless enough on a clay-bank, but it by no means confines itself to such localities; for, if the truth be known, it is one of the deadliest of all the parasitic fungi. They sud-



FIG 12—SPECIMENS OF DIFFERENT KINDS OF TOADSTOOLS

The caps of some of these are no bigger than one's little finger nail. This is true of those seen here at the top of the figure, that is the little army of brilliant orange mushrooms there figured. This is *Omphalia campanellus*, and they grow in patches in deep, shady woods, often covering a square yard of ground. The lower three to the right are fine specimens of the Wood Mushroom (edible) *Agarius silvicola*. The remaining four may be young "Death Cups." These are much larger than *Omphalia*.



FIG. 13—SPECIMEN OF THE BRACKET FUNGUS

Most children know this Bracket Fungus, for the reason that they can draw on its white surface, which is porous and turns dark brown with the slightest scratch. This thick "bracket" is found growing in groups on rotten logs and dead trees. The concentric rings, so plainly indicated upon it, each indicate a year's growth.

denly infest the bark of some big, handsome tree, and rapidly appear in ever-increasing groups. The death of the tree in time is certain; and should one undertake to kill the pest by chopping them off, others soon spring up to replace them. Indeed, these mushrooms are nothing more or less than the fruit of a parasitic fungus of a very harmful variety. They are certain death to any of our orchard fruit trees, as, once starting to produce, they may cover nearly the entire trunk for 8 or 10 feet up from the ground.

Many "bracket-fungi" are likewise parasitic, and deadly enemies of some of our best forest trees. To break them off in no way eliminates the cause of destruction, for the matured "bracket" is but the fruit of the parasite, and will soon reappear after such treatment.

Professor Krieger, in speaking of the bracket fungus known to science as *Polyporus applanatus*, says: "Provided with nothing more than a good fresh specimen of this fungus and a stylus in the form of a sharp-pointed branchlet, conveniently picked up at his feet, the artist

mycologist may proceed to sketch the landscape. If he has the ability of a Seymour Hayden or a Pennell, the result will compare favorably with a good etching. After the fungus is thoroughly dry, the picture is permanently fixed, and it may then be set up in the summer bungalow to recall a day pleasantly and profitably spent."

Should it enter the head of any forester to gather mushrooms to cook or otherwise prepare for his own consumption or that of his friends, he should never undertake to do so unless he is practically an expert in recognizing with absolute certainty all the species known to grow over the area where he intends to collect them. Unless he possesses such knowledge, it is far wiser for him to confine himself to other food. Many of them are, as we know, very delicious; but the chances of running up against poisonous varieties are so great, the eating of them so fatal, and the resulting death so horrible, that it is much better to avoid them entirely. There is a large literature upon our mushrooms—all the way from the common edible mushrooms of the markets (*Agaricus campester*) to the vilest

of all the death-cups; but it should all be studied and *used* with the greatest caution.

In a brief article like this one, it will be quite impossible to give any rules for gathering the various kinds of edible mushrooms; in fact, were the article three times its length, it is far safer not to do so. However, should any one of our forest lovers have a leaning towards the study of these fungi—so many of which are so fatal to the best trees of the forests and our orchards—it is well to know that an entire division of the United States Department of Agriculture is given over to the consideration of these growths in nature. Bulletin No. 15 is an excellent example of these publications, while every civilized country on the globe has contributed to the literature of this subject.

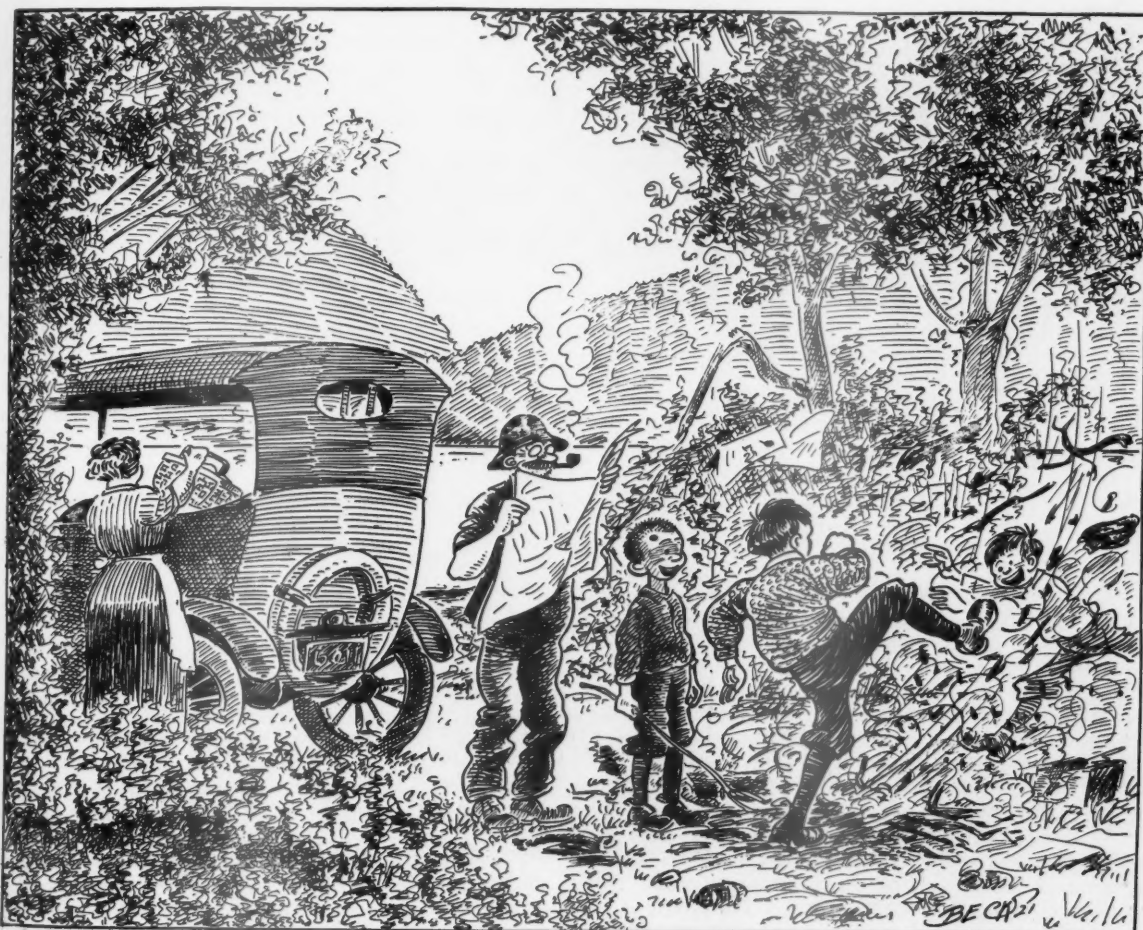
So dangerous is the poison found in some of the fatal *Amanita* family of mushrooms that, as Dr. W. W. Ford has shown, it can only be rendered inert through long boiling in the strongest acids known to the chemist.

The part played by fungi in nature reads like a fairy-tale; so fascinating has it been found to be, and so intense is the desire of many people to be able to diagnose

the various fungi—including all known species of mushrooms—found in this country, that we find in many of our large cities mushroom clubs, organized for no other purpose than to cultivate the science of mycology, and to extend the knowledge they acquire in such a way as to reach and be of use to the greatest number of people.

Many fungi are the deadliest of all known enemies of trees and the various kinds of grain. The “diseases” are known as rust and as blisters, such as the “black-stem rust” that a few years ago destroyed tons upon tons of wheat in this country and in Canada; while all will remember the damage done to the chestnut trees by still another fungus ten or twelve years before, which destroyed—indeed, near exterminated them. Now comes the danger to the pine through the “White Pine blister”—a most fatal form of fungus, demanding all the attention that the expert possesses of such enemies to successfully combat, in that thousands of acres of pines shall not be exterminated in various parts of the country where it has made its appearance. It, too, is a fungus and a cousin of the toadstools.

## DOWN THE ROAD



One way to leave a camp fire so that it will make a forest fire



## FOREST GUIDE DEPARTMENT

SOLAN L. PARKES, EDITOR

THIS DEPARTMENT IS CONDUCTED ESPECIALLY TO CONSERVE AND PRESERVE THE FOREST AND THE LIFE THEREIN, WITH THE YOUTH OF THE COUNTRY AND THE YOUTH WITH THE FORESTS.

CAN girls be forest guides? Certainly! Girl forest guides can help conserve and preserve the forest, just as well as the boys. For the forestry problem can only be solved if we all co-operate.

In the spring of 1915, I came across a tract of what formerly had been agricultural lands, but which had been taken over by a city for the protection of the watershed. All over sumac, some wild cherry and other growth could be noticed. It took some time, in fact, several months of effort to convince the city fathers, that these lands should be reforested with worthwhile trees, that would not only give a greater protection to the watershed, but that at some future day would also give a timber supply. These lands surround a beautiful lake.

\* \* \*

After the city fathers agreed to the plan proposed, an order was placed for trees. The next problem confronting us was the planting. The matter was presented to the principal of the Girls' High School, who immediately informed us, with a smile, that the girls would not help. We begged to present the matter to the girls. The privilege was granted, with the result that four hundred and thirty High School girls, that afternoon, planted eight thousand trees. The following year, 1916, we again appealed to the same school. This time seven hundred and seventy girls responded. Today there are now growing, practically two hundred and fifty thousand trees on the lands surrounding the lake. It was but a few days ago that the superintendent in charge of this department stood by the side of a tree, which when planted in 1915 was but three inches above the ground, and now measures eight feet five and one-half inches.

The outcome of the 1915 response of the four hundred and thirty girls brought about annual tree planting campaigns elsewhere, and as a result several million trees have been planted on non-agricultural lands where no trees were growing formerly, all of which I doubt would have happened had this girl leadership not been given.

No further argument is needed in this locality about the girls being able to render valuable service in the cause of forestry, for on more than one occasion I have found them assisting on the forest fire line, extinguishing forest fires, and time and again they have reported fires, which otherwise might have done considerable damage.

The girls have entered with the same spirit as the boys in bird house building campaigns, in the protection of the wild flowers, and on many occasions have established feeding stations, during the cold winter months, to preserve bird life, when no other food could be secured by our feathered friends. \* \* \*

Girl Forest Guide Troops can be organized all over the nation. Those who are interested to become leaders or members of troops should immediately address the editor, either care American Forestry Association, 1214 16th Street, Washington, D. C., or Box 9, Reading, Pennsylvania. The details of the plan for the organization of troops are almost completed, and we expect soon to present them to the public, in order that each of us may do our bit in helping to conserve and preserve these God-given nature



THE GIRL PLANTERS

This is one field where "equal rights" prevail. In other words, it is just as right for a girl to be a tree planter as for a boy, and these girls proved it by planting eight thousand trees in one afternoon.

gifts. The same camping plans, proposed in the June issue, will hold equally good for boys and girls, except that the personal equipment and requirements naturally must conform to the needs of the user. Girls have proved their right to enter the lists with boys as A-1 tree planters.

# PERENNIALS

BY F. L. MULFORD

WITH a yard well planted with trees and shrubs about the borders and a good turf in the center there is still something lacking to make the home surroundings the most attractive possible. Although green foliage is the most important single factor in landscape adornment flowers wonderfully brighten the effect. Many of the shrubs used for ornamental planting have in their season a wealth of attractive flowers, but, as a rule, they do not last long. For this reason it is frequently advisable to supplement the shrub plantings with other plants that will add to the floral effect. This can be done by putting

in annuals every year, but this requires much labor and attention to attend to all the details at the proper season and the results can only be enjoyed in the summer and fall. The most satisfactory way of obtaining additional floral effect about the home grounds is to use herbaceous perennials in connection with the shrubs, and often it is possible

to use them in a flower garden at some appropriately secluded place about the grounds. Such a garden need not be large to be enjoyable, but it should be somewhat shut off from the street view so as to have a privacy comparable to that of the living room of the home. If it can be viewed from the living room, the dining room, the porch or some other much-used portion of the house so much the better. In the case of over nine-tenths of the homes of the country the most important place for a flower garden or other attractive view is opposite the kitchen window, where the housewife stands to do so much of the work for the benefit of the family.

Such a garden may take many different forms, according to the conditions and the preferences of the gardener. Some times the garden may be rectangular or square, again it may be round or oval, or it may be irregular in shape or be mere strips on the sides of a path or par-

allelling a wall or fence. It may appropriately include annuals and also woody plants. Its purpose may be to grow flowers for cutting, it may be an end in itself, or it may be a combination of the two.

When planting perennials, whether among shrubbery, around the lawn or in a special garden, it needs to be kept in mind that most of them require more care and attention than well-established shrubs need. They do not have the same ability to suppress their undesirable neighbors by shading them to death, so that they require more attention as to weeding and cultivation. Again

many of them are such rampant growers that they may be said to be their own worst enemies, for they so overcrowd themselves that they have to be thinned to do their best. Further, they need an abundance of plant food, and this is often best supplied by lifting the plants, spading in a good coating of manure and re-setting the plants. On the

other hand, there are many herbaceous perennials that need to be left as severely alone as do rhododendrons.

There is a host of kinds with the widest range of preference as to conditions under which to grow. Some prefer sun, others shade, some prefer dry situations, others bogs, some clay, others sand, some are tall and others short, some are showy in flower others dainty or inconspicuous. Of all this multitude of kinds but few are very widely cultivated, but these few kinds have been developed into many varieties, in some cases running into the hundreds, as with peonies. It would seem as though a plant must be available for almost any conditions under which it is desirable to grow them.

The beginner will do well to select at first from those kinds that are most widely grown and are best known and then, as experience is gained, less common kinds can be added. This holds equally concerning varieties of



A BEAUTIFUL BASE PLANTING

This herbaceous border on the edge of the lawn softens the ground line of the house and is effectively made up of physostegia, or false dragon head, tiger lily and marsh-mallow, with hardy phlox in abundance and the annual portulacca in front.



A VERY HANDSOME BORDER OF PERENNIALS

Hardy phlox is the most important feature of this striking and distinctive border, flaunting its brilliantly colored blooms against a quiet green background of mixed planting. Phlox is one of the showiest as well as most satisfactory of the perennials.

those plants of which there are many offered. This is not meant to suggest growing plants of which the names are not known, just because they may be commonly grown in a community. An effort should be made to have only named varieties of those plants that have been cultivated so long that named varieties have been put upon the market. By growing named kinds greater satisfaction comes to the gardener in the same manner that knowing the names of those with whom we mingle in a business way or socially gives greater satisfaction. Then, too, it is easier to talk with others interested in growing flow-

## FIRST CHOICE

Le Cygne	Medium Early	White
Soulange		Salmon center to bluish
Therese	Medium Early	Violet rose to white
Mme. Jules Des-sert	Midseason	White shaded flesh
Tourangelle	Midseason	Flesh tinged salmon
Festive maxima	Early	White
Lady Alexander Duff	Midseason	Pale rose
LaFrance	Medium late	Rose white
M. Jules Elie	Medium	White
Sarah Bernhardt	Late	Pale mauve rose
Walter Faxon	Midseason	Bright rose
Baroness Schroeder	Medium	Flesh white
Mme. Emile Lemoine	Medium	Milk white
Marie Crousse	Midseason	Pale lilac rose
Milton Hill	Late	Pale lilac rose

ers, so that information is passed along. Although many kinds of these plants are grown readily from seed it would be well for the beginner to buy plants until experience is gained in handling them. Of course, named varieties can only be secured by buying plants. With those plants that vary much and thus have produced a large number of varieties there is much of interest in growing seedlings to see if something better than the things already being grown can be produced. This, however, is only desirable for the experienced gardener who has already grown a large number of varieties of the plants in which he is inter-





WITH EVERGREENS AS A BACKGROUND

This herbaceous border is very good, with some annuals in front of the evergreens and groupings of hardy phlox, zinnia, coreopsis, aster, false dragon head, and a small hollyhock and gaillardias in bloom interspersed with plantings of iris, columbine and hardy chrysanthemums.

ested and so knows what is already available. In many parts of the eastern United States the transplanting of spring and summer flowering perennials may be done either spring or fall, preferably the latter where they will stand the winter. In the neighborhood of New York City, in the southern parts of Pennsylvania, Ohio, Indiana, and Illinois the latter part of August and September is a good time for this work, if there have been good rains so that the ground is well supplied with moisture. North of this transplanting would best be done in spring. Farther south the season would be later, beginning about a month before the usual date of the first kill-

## SECOND CHOICE

Karl Rosenfeld	Midseason	Dark crimson
Rosa Bonheur	Midseason	Light violet rose
Albatre	Midseason	Rose white flecked crimson
Avalanche	Late	White — some cerise flecks
Alsace Lorraine	Late	Cream white to yellow
James Kelway	Early midseason	Rosy white
Asa Gray		Pale lilac (Very distinct variety)
Grandiflora	Very late	Rose white
Marguerite Gerard	Late	Pale pink
Marie Lemoine	Very late	White
Albert Crousse	Late	Rose white flecked crimson
Claire Dubois	Late	Violet rose tipped white
Eugene Verdier	Late	Pale hydrangea pink
Mme. Auguste Dessert	Early medium	Violet rose
Mme. Emile Galle	Late	Deep lilac white
Venus	Midseason	Pale hydrangea pink

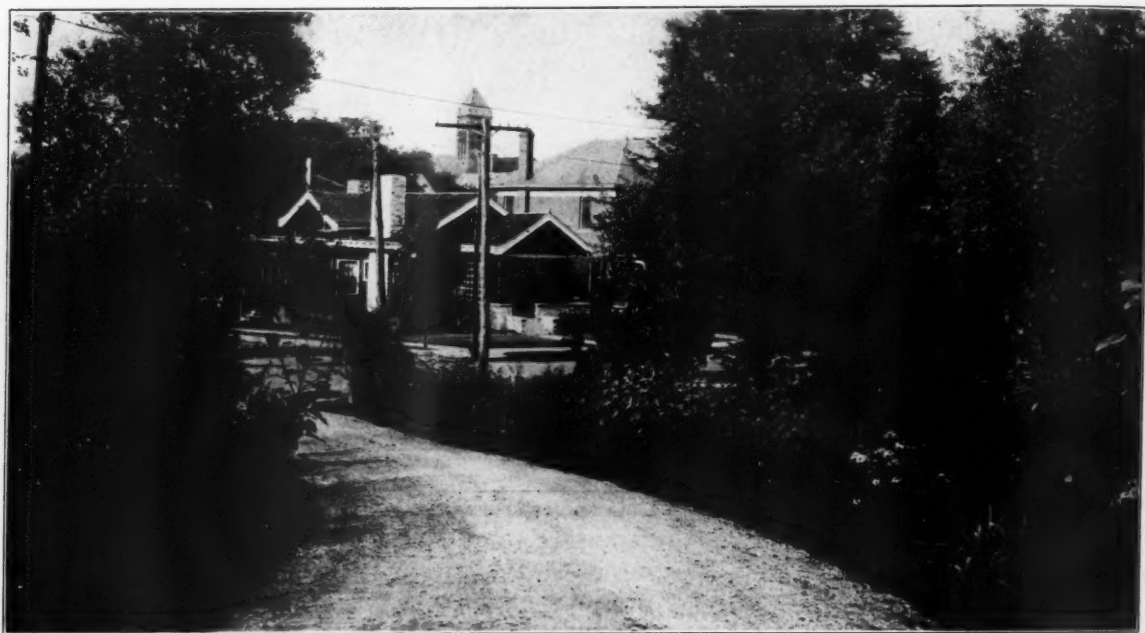
ing frost, and stopping two months before the ground freezes up, in those regions where the ground freezes more than an inch or two deep. Where the ground does not freeze transplanting may well be done as soon as the ground is wet enough in the fall to insure a good root growth. Moisture rather than temperature is likely to be the determining factor in the warmer parts of the country. Herbaceous perennials have been more grown in those parts of the country that have a climate similar to western Europe than elsewhere, largely because our people have traveled much abroad, have admired the flowers there, and have come home and

tried to grow the same things here. The result has been that in those sections with cool and moist summers the European plants have succeeded and in the regions of hotter, drier summers the European plants have failed and, therefore, herbaceous perennials have been said to have failed because proper kinds for the conditions were not selected. This shows the need for selecting kinds suitable to the region. Because gardening has been practiced longer under moist conditions than in drier climates there are more plants available for such regions than for drier situations but with care in selecting for the drier countries much better results can be obtained than is generally realized.

When a resetting of the perennial bed is determined upon, the plants should be lifted with all the dirt possible and be lightly "heeled in" in a shady place, or if this is

the place from which the leaves of stemless plants arise and the roots descend. A strawberry plant is a good example of a plant with a crown. If this should be planted so that it becomes covered with soil the plant will die, while, on the other hand, if it is planted so that a portion of the roots just below the crown are exposed to the air and consequently dry out then again the plant will be killed. On the other hand, plants with corms, root-stocks or tubers that are more or less stemlike, roots should be planted with the growing end or buds two or three inches under ground. A plant with bulbs, that is, enlargements composed of a number of leaflike parts wrapped about one another, should usually be planted two or three times as deep as its own diameter.

In those regions where there is severe freezing weather or alternate freezing and thawing for a greater depth than



THE APPROACH TO THE HOUSE

This is a place where the hardy perennial may be used most effectively—in a herbaceous border along a driveway as the planting can be done so that one or two of these showy plants is always in bloom. In this bed mallows and phlox are just now at their best.

not available as nearly a shady place as possible and then covered with a wet burlap. Well-rotted manure in liberal quantities should then be spaded into the soil as deeply as possible, for most plants about as much manure as can be worked in. The quantity of manure used may seem extravagant, but it must be remembered that the ground is being fed for three or more years of heavy demands as no new supply can be worked in until the plants are again dug for resetting. After this thorough preparation of manuring, spading, and fining of the surface the plants should be taken from the place where they have been "heeled in," divided into pieces appropriate for the kind and those portions selected should be at once reset with the crowns of those that have crowns just level with the ground. A crown in this sense being

an inch or two, the perennial bed should be covered with a good coating of manure as soon as the ground freezes well in the fall for the purpose of protecting most plants from alternate freezing and thawing, although for a few it is protection from the cold that is necessary. As soon as freezing weather is past this covering should be removed from the plants and usually as much as possible should be permitted to remain on the bed between the plants to act as mulch and for the benefit of the little remaining plant food that may be in it.

The cultivation of many of the kinds should be by clean hoeing, but others need only the pulling of weeds near them, as they do better without the soil being worked about the roots. Some, in fact, are most at home under wild or semi-wild conditions, so that all these require is

to have removed any specially obtrusive plants that seem to be taking more than their share of the room.

As already stated, there is such a wide range of kinds that it would seem as though any tastes and conditions might be satisfied. Among the commonest of the spring flowering perennials is one of the bulbs, that is the common daffodils or *Narcissus*. There are many kinds ranging from white to deep yellow, with some modifications. The yellow kinds are most common and are most easily grown throughout the northern states. They behave as most perennials in regard to over-crowding themselves to the extent of requiring to be dug and replanted about every three years. The bulbs should be planted in October or farther south in November. Two splendid varieties are Emperor, a deep yellow, and Empress, a deep yellow trumpet and pale yellow perianth. Double narcissi are not satisfactory.

Iris give a long season of bloom and a great variety of heights. Some of the early kinds grow less than six inches tall, while the Japanese Iris, a summer kind, grows to a height of four feet and more under favorable conditions. Some of these dwarf kinds are *Cristata*, four inches; *pumila*, not much taller; *nudicaulis*, not over twice as tall, all of which are deep purple. Later come the so-called German Iris, an unknown mixture of several species. In the neighborhood of Washington these bloom during May, with blue and white and mixtures with yellow predominating. For landscape effect the common blue flag is not surpassed in color and is as satisfactory as any, unless it is to be viewed at close range. Mrs. H. Darwin, seen at a little distance, is practically white, while Madam Chereau is white, pencilled with blue. Iris *pseudo-acorns*, the common yellow water flag, is a handsome yellow species that does well on moderately dry ground and is one of the few iris that will grow in standing water. A distinct type of iris of about the same height and of a little later bloom, with narrow foliage and smaller flowers, is the Siberian Iris, of which there are several varieties in white and blue. The flowers of the species are equal in color to the improved varieties, but are smaller. It is a very decorative plant. The Japanese Iris comes later than those mentioned and has the largest flowers, as well as being the tallest. It succeeds well on upland but does best in moist but well-drained soil. It also responds to an abundance of fertility and does not object to manure only partially rotted. Heavy mulching with manure is a benefit. With the other irises and the German Iris in particular, mulching with manure is liable to induce a rot that is quite destructive, therefore, the manure that is applied to these plants better be well rotted and be worked into the ground promptly in small quantities.

Among the showiest of the late spring and early summer perennials is the peony. These come in rose reds and white with intermediate shades. The flowers are large and although the blooming season is rather short, especially where hot-dry periods are likely to occur during flowering, yet they are most satisfactory in landscape

planting, as the foliage remains good throughout the season, in addition to the plants making such a show when in flower. Like the iris, the plants are best set in the late summer or early fall, although they may be set in the spring, but the flowering results are likely to be postponed a year by late planting. When once planted, peonies may be permitted to remain without dividing or resetting for a good many years, plants being known that are still doing well after twenty years. They do not come to their best until after iris, daffodils and many other plants need replanting.

After frost has killed the tops, but not before, they should be cut off and when the ground freezes a good application of manure should be given, which should be worked under in the spring. They are gross feeders and respond to plenty of fertility and do not require that it be as well decomposed as many plants require.

Varieties are numbered by the hundred, but the American Peony Society is trying to eliminate the poorest by a comparison of varieties as grown under different conditions. In selecting varieties it is not necessary to always choose the highest in price, as frequently good varieties are moderate in price because they are free growers and are not of recent introduction.

The lists given here represent the combined judgment of a large number of peony growers in all parts of the country, as collated by the American Peony Society.

With and after peonies come perennial poppies, coreopsis, gaillardias, pyrethrum roseum, fox-gloves, sweet Williams and other hardy pinks and hardy larkspur or delphinium.

Later come the hollyhocks, Canterbury bells, Chinese bell-flowers and yuccas, followed closely by the hardy phlox, of which there are many kinds. This is probably one of the first plants of which there are a large number of named varieties on the market for the amateur gardeners to begin growing for themselves. They are easily grown from seed planted as soon as gathered, although if kept for a few weeks it is difficult to get it to germinate. The variation in seedlings is great, but the commercial value of new and attractive forms is not sufficient for these to be a temptation to name and put them on the market, although it makes it possible for each gardener to have a distinctive form or forms upon his own grounds.

Along with the phlox comes the mallows, marshmallows and in the South, hibiscus, rather coarse-growing plants, attaining a height of five feet, but having showy flowers shaped like hollyhocks and rose of Sharon, in white and shades of pink, and red. Some of the lilies bloom at this season, too, also *physostegia*, or false dragon head, followed by *montbretias*, showy, bulbous plants from the Cape of Good Hope, growing two or three feet high and having spikes of orange or scarlet flowers. Their foliage is somewhat similar to Siberian Iris. At this season also comes the *tritoma* or red-hot poker plant. This has foliage more like yucca, with orange or scarlet flowers on tall spikes. These last two



plants are not so well adapted north of New York and Columbus, Ohio. Later about the first of September, come Japanese anemones, among the most dainty and handsome of our perennials. This, too, is the season of our common wild aster, a most worthy plant for the perennial garden. The English have developed several named varieties with much larger flowers than the average of our wild specimens. Golden rod also comes at this time, while a little earlier there are cardinal flower, joe-pye weed, and iron-weed. The season closes with hardy chrysanthemums, with many forms, from small and large singles, tiny double buttons and larger fully

double flowers, some of which are inclined to be quilled. The colors range from deep rose through pink to white, lemon, yellow, bronze and brick red. There are many named varieties, but unfortunately a large proportion of these are not entirely hardy in the more northern sections, and so require special protection to have them winter satisfactorily. Then too, early frosts or rather freezes may in about one year in three injure the flowers, especially of the pink and white varieties of the daisy-like and somewhat quilled types. New early flowering varieties are being constantly introduced. In the South these plants do splendidly, but with such little care that their value and possibilities are not appreciated.

### CONSERVATION

I will not break this blossom wantonly,  
Its smile and fragrance it has given to me;  
Some other day the children will come here  
And find this blossom's children blooming near.

I pray that God shall guide me day and night,  
Keep young my heart and make my footsteps light,  
That neither wayside bloom nor drowsing bee  
May know of anguish or of death through me.

I would not mar a line that Raphael drew  
That other eyes may share its beauty, too.  
Nor spoil a bough within the leafy wood,  
Nor change the sunset glories if I could.

A robin! hark! it sings in yonder tree,  
Nor tree nor bird shall suffer harm from me;  
Some other day the children will come here  
And find that robin's children singing near.

—LEANDER GOETZ



(Gillam Service)

### WORLD'S LARGEST FIG TREE

Not growing in the Orient, as might be supposed, but right here in the United States, out in the San Joaquin Valley, near Fresno, California. Last year it produced two tons of marvelous white figs, which netted its owner over \$500. This year the crop will be larger and even more valuable, as the tree is constantly growing and producing more fruit. The tree really consists of five trees which were planted in a circle with one in the middle. At a certain age the tops were grafted together, making one tree. As fig trees live to a great age and continually increase their growth, it is figured that 100 years from now this tree will be producing \$1,500 worth of fruit annually. This picture shows the base of the tree and its owner, Roy DeWirst.

## GETTING EVIDENCE ON FORESTRY NEEDS

ALL sides of the forestry situation have been heard and discussed by the National Forest Policy Committee of the Chamber of Commerce of the United States which early in August completed a tour of the East and West to gather information in order to make a report on the need of forestry legislation.

Meetings were held in New York, Chicago, Minneapolis, Seattle, Spokane, Tacoma, Portland and San Francisco. At these meetings foresters, lumbermen and others testified and the committee returns with a great fund of valuable information. Its report is awaited with unusual interest on account of the effect it will have upon Congress in its consideration of forestry legislation.

A particularly gratifying feature of the hearings is expressed by Chairman D. L. Goodwillie, of the committee, who says:

"It is indeed significant that with Oregon and Washington owning fifty per cent of the remaining standing timber in the United States, the lumbermen operating in these forests have expressed with such clearness and vision their willingness to co-operate with the federal and state governments in making these forests permanent. Our conference showed clearly that the far-sighted lumbermen of this district feel the time is here when a national forestry policy must be formulated—not in response to local demands alone, but to the larger demands of the nation. The national forestry question has been brought to the fore by the predicament of states like Pennsylvania, which at one time was a great exporter of lumber, but today imports ninety per cent; by the serious shortage of pulp wood in New England, and of hardwoods in numerous industries. While types of forests, fire hazard and methods of logging vary in the different districts, the interdependence of our great industries on supplies of lumber and timber from all sections makes this a national problem."

Members of the committee expressed themselves as being surprised with the steps which the lumbermen of the Northwest have already taken along lines of fire protection. Also at the evident willingness of the lumbermen to co-operate with those in the East who are desirous of developing a national policy. Some of the committee had been led to understand that the attitude of the Northwest was anything but friendly to this idea.

Col. W. B. Greeley, United States forester, at the Chicago meeting gave a remarkable presentation of the entire forestry situation in the United States. He pointed out that we are cutting timber four times as fast as we are growing it and that 61 per cent of all the remaining timber in the United States is west of the Great Plains. Fifty per cent of all hardwood is in the southern Mississippi States; 61 per cent of all the remaining softwood is on the Pacific Coast.

He said the burden of increased freight expense is exemplified by the fact that Chicago alone pays yearly \$22,-

500,000 for extra freight expense on lumber as compared with what the freight on the same amount of lumber would have cost thirty years ago.

"This expense might have been obviated," said Col. Greeley, "had the great timber states in the northern part of the Mississippi Valley applied the principles of forestry in former years, for there are millions of acres of barren lands and lands with poor stands of timber in these states which would now be producing forests had forestry been practiced at the right time.

"Some day we must pay the bill and at far greater cost than if we start at once to develop our forests. The mounting expense of higher freight due to transporting the lumber for greater distances might better be applied to developing our forests nearer at hand."

A. L. Osborn and C. H. Worcester raised the question regarding the effect on the lumber industry because of their having to cut forests on certain regulations, pointing out that an increase amounting to \$2 in the cost would practically be equivalent to confiscation.

Col. Greeley declared that the cost would be passed on to the public, but Mr. Worcester did not agree, stating that the cost of producing lumber unfortunately did not control the price.

Col. Greeley said that the experience of the government in its own forests where forestry methods have been applied, furnished a rough basis for comparison. He thought that an average figure of \$1 per thousand might cover the cost. As 52,000,000,000 feet of timber are used in the United States every year, this would mean a total extra cost to the public of only \$52,000,000, which as it would be equally distributed, would be an insignificant tax to pay for the preservation of our forests.

As a safeguard to the lumbermen, Col. Greeley advanced the idea of the commission used by Sweden. Commissions of this type, representative both of the lumbermen and the public, would be set up in the individual states and would hear special cases of complaint regarding unreasonable regulation and provision could be made for appeal from the findings.

Prof. Filibert Roth, Dean of the Forestry School, University of Michigan, predicted economic disaster unless the government take steps immediately to create forests. He cited the experiences of European countries. Germany was originally a forest land but permitted her forests to become brush lands and it took her six centuries to restore the forests. It is his idea that in the very nature of things, timber should be grown by the public. He insisted that the extra expense of changing our methods of lumbering and growing new forests should be borne by the public. He advocated a constitutional amendment which would give to the federal government unquestioned police power to regulate the forests in the states.

Ex-Congressman James W. Good pointed out the need of educating the public on this important subject. He hinted that this might be a difficult time to get Congress to appropriate money for reforestation on account of the universal demand for retrenchment in government expenditure. Major W. H. Hall pointed out four requisites of the National Forestry Policy, first: increasing the national forests; second, protection from fire, insects and fungus; third, more complete utilization of wood, and fourth, reforestation involving regulation of timber planting.

"Economic conditions throughout the country require that lands unfit for agriculture and suitable only for timber growing should be put to work, and Minnesota has several million acres of such land," Governor J. A. O. Preus told members of the National Forestry Policy Committee at its hearings in Minneapolis. "Timber growing by private individuals is rendered almost impossible because of taxation," continued Governor Preus. "Either these worthless lands must be gotten into the hands of the public or some method of relief from taxation be devised. This is going to be a difficult problem because there is an increasing disposition to tax natural resources such as iron, coal and timber by means of the so-called Severance Tax."

State Forester W. T. Cox, of Minnesota, stated that fire protection had proven effective and could be made more so by increased expenditure.

J. M. Hughes, Land Commissioner, Northern Pacific Railroad, urged that tax laws be amended so that the burden from that source would be lessened. The average tax paid by the Northern Pacific on its timber lands was 1½ cents per acre ten years ago and last year 16 cents, the total bill paid the government being \$800,000. Mr. Hughes added that there is no indication that taxes will stop increasing. Sixty per cent of their timber holdings are at present inaccessible and will not be accessible for thirty years. If the present rate of taxation should continue it would not be practical for the company to hold this timber.

T. B. Walker, the largest individual timber owner in the United States, testified at length and pointed out the weaknesses of our federal land laws as compared with the laws of Canada. He pointed out that it was not the lumbermen but the laws that were responsible for the wastefulness of American methods. Mr. Walker stated that he did not believe trees could be grown except by actual planting. State Forester Cox and others present took issue on this point, and cited cases in Minnesota where good reproduction had been obtained by methods of cutting and forest regulation.

The meeting developed an important question regarding present freight rates, it being pointed out by Mr. Gilkey and others that a large amount of low grade forest products were not marketed because in many instances the railroads charged as high rates on these low-grade products as on high grade lumber, as much on sawdust and shavings as on sash and doors.

Leading lumbermen, timber owners and operators of the Inland Empire, to the number of forty, met the Committee at Spokane. An interesting discussion brought out many points of value to the Committee. One of the principal speakers was Mr. A. W. Laird, of the Potlatch Lumber Company, who gave a picture of Idaho conditions and emphasized the willingness of the lumbermen to co-operate with the government in establishing a forestry policy which would be for the benefit of all. This same idea was strongly emphasized by Mr. Huntington Taylor, of the Rutledge Timber Company; W. D. Humiston, of the Potlatch Lumber Company, Idaho, and others. Such was the evident sincerity of the lumbermen in their willingness to submit to some form of government regulation that it elicited a statement from some of the Eastern members of the committee that it was a different attitude from what they had expected to find.

Discussion developed the fact that Idaho and Montana are today practicing forestry methods along lines approved by the government, and are actually co-operating with the government in the important matter of fire fighting. "It is not a theory, but an actual fact," said Mr. Huntington Taylor, "that we have demonstrated the practicability of co-operation with the government and of handling our forests in line with their regulations."

Like the Chicago and Minneapolis meetings, the Spokane discussion brought out the same situation regarding fire protection and taxation as being the chief obstacles to private practices of forestry.

"The farming element is suspicious of the lumberman," declared one speaker, "and have refused to make modifications in the tax laws which would make it possible for lumbermen to carry their cut-over lands."

"As the matter stands," he said, "the taxes are increasing instead of decreasing and the man who spends money to leave his lands in good condition for reproduction is confronted with a heavier tax than if he left them denuded. No one expects the lumberman to be a philanthropist, but that is the only way that he can practice forestry under the present system of taxation."

Fire protection was admitted by all to be the chief factor in growing new forests. Mr. T. T. Munger, of the United States Forest Service, Portland, stated that fire protection was 90 per cent of the reforestation problem in the Northwest.

"Burning of slash costs the forest service in the western yellow pine territory 35 cents to 45 cents per 1,000 feet," said Mr. Munger. "In some cases it costs only 5 to 8 cents."

C. L. Billings, Land Agent of the Rutledge Lumber Company and Assistant Secretary of the Coeur d'Alene Timber Protective Association, favored federal aid in fire protection; also a state law for Idaho, mentioning the fact that Oregon and Washington have state laws.

Regarding the possibility of fire insurance on timber, Mr. Laird stated that this subject had been considered, "but was too big a nut for us to crack," he said. "The rate would be so high as to be prohibitive."



Formulation of a state taxation system which does not compel the timber holder to cut his trees as rapidly as possible in order to safeguard his profit was advocated by Northwest lumbermen in the two-day conference at Seattle.

Leading lumbermen of Washington, which state annually cuts more timber than any other in the Union, scored the present taxation system as forcing lumbermen to sacrifice their holdings, and preventing reforestation and conservation. These burdens are not only true in Washington, but in other states with large timber resources, they asserted. They declared that private enterprise cannot afford to reforest and wait 50 to 60 years for returns under the present system, and that unless restrictive measures are removed the federal government and state must take up the burden.

The British Columbia yield tax system, which protects the holder of timber lands, was praised, and prevailing sentiment favored a similar measure in timber states of this country.

Testifying to the harmfulness of the present taxation laws, State Senator Alex Polson said that in his county, a typical example, the tax rate on timberlands has increased from seven to eight hundred per cent. This means that the taxes gradually confiscate the land. He favored the Canadian system of imposing a fixed charge, say \$125 a section, with the government receiving stumpage when the timber is cut. He said he believed private owners would take care of reforestation if they were financially able to do so.

Professors from the College of Forestry at the University of Washington, Seattle, asserted that with proper reforestation the Pacific Northwest could cut two and one-half times as much timber as last year without diminishing the supply. In other words, the country could draw on this section for approximately 25,000,000,000 board feet a year as a permanent output.

Reforestation and protection of green crops can be effectively carried out at a cost of about \$3 or \$4 an acre, annually, was the gist of testimony.

It was brought out that the stumbling block in the way of changing the present system is the making good of the immediate tax loss the state would suffer if the annual collection system were changed.

"Lumbermen should organize to exploit their interests," was the keynote of testimony from O. M. Butler, head of the federal forest products laboratory at Madison, Wisconsin. "The Federal Government is spending \$57,000,000 for research and education, but only one-half of one per cent is being used for lumber research."

That 1,500,000 additional acres of land would now be producing timber in Western Oregon and Washington had it not been for the ravages of forest fires, was among the statistics produced before the forestry conference at Portland.

George H. Cecil, United States District Forester, emphasized the menace of fires in their relation to the future

timber supply and supplied the figures as to the destruction to date.

"Besides killing outright all of the merchantable timber on millions of acres, fires have caused untold damage by killing trees here and there and injuring others, with the result of greatly depreciating the commercial value and the volume of the forests so fire-scourged," he said.

Reforestation in the wake of the logging operations and of the fires was taken up and dwelt upon in detail by the various witnesses and members of the committee. The planting of young trees at an average of 2,000,000 per year for the next 75 years was advocated by Dr. Hugh P. Baker, of New York, a member of the national committee, and secretary of the American Pulp and Paper Association. Dr. Baker produced figures to the effect that the normal timber consumption in the country amounts to a cut of 56,000,000,000 feet, to which he added firewood consumption of about 110,000,000 feet.

David L. Goodwillie, of Chicago, chairman of the committee, dwelt upon the necessity of federal and state cooperation in reforestation work.

"Fire protection and the losses here must be put fairly before Congress. When we can create the sentiment, the proper protection will come," he declared.

E. T. Allen, secretary of the Western Forestry and Conservation Association, discussed the relation of taxes to the diminishing timber supply.

"Mounting taxes make it impossible for the timber owner to hold his timber as a long-time investment," he argued. "The consequence is the cutting in excess of the demand with the resulting low prices during periods of light demand. Prices have become so low that the inferior logs and species are left in the woods."

Dr. Henry S. Drinker, of Merion, Pennsylvania, tax expert for the committee, urged the yield tax as the solution for the lumber producer. Discussion of this point brought out that opinion was inclined to believe that while the yield tax might place a heavy burden on the owners who have been paying taxes for many years, it was an improvement over the present situation. Robert E. Smith, Portland banker, urged that the yield tax would offer encouragement to the owners of cutover lands on which young trees were growing and who would not have to pay taxes until the timber was finally cut.

IN 1913 the United States imported into France common woods to the equivalent value of \$5,000,000 as estimated by the French Customs, and precious woods valued at \$720,000. The first three months of 1921, total value of common woods from United States was estimated by French Customs as \$500,000, at year's average rate of exchange. This is one-third of valuation of same period in 1920, which was much below pre-war trade.

WOODS imported into Belgium from the United States the first quarter of 1921 were valued at 2,839,638 francs.

# FOREST EXPERIMENT STATION FOR THE SOUTH

BY E. H. FROTHINGHAM, ACTING DIRECTOR

## APPALACHIAN FOREST EXPERIMENT STATION

[Read before the Southern Forestry Congress at Atlanta, July 22, 1921.]

LESS than six months ago the Appalachian Experiment Station, like its twin sister in the South, was in the category of things hoped for but not confidently expected. Today they are a fact. The "neatness and dispatch" which characterizes this achievement are apparent rather than real. There is a hidden background of hard and persistent effort by public-spirited and determined advocates to whom the friends of forestry in this region must ever be grateful; for the final establishment of these long-cherished stations must be highly gratifying to those who have at heart the broad economic development of the South, and particularly to those who know something of the difficulties with which the management of the forests has contended in the lack of precise knowledge of the requirements and response to treatment of the many different tree species and forest types.

No forest region in North America, it may be confidently stated, presents so great a variety of forest problems or, as a result of their solution, such large promise of real benefit in money returns, as the Southern Appalachian region. Its forests, in which northern and southern species mingle and in which many of the finest trees of the East are abundantly represented, are the most complex, botanically and silviculturally, in the United States. With a copious rainfall, moderate temperatures, long growing season, and deep soils, it is admirably fitted for tree growth. Its rugged topography and high relief result in a profusion of forest sites and types unequalled elsewhere in the East. Potentially this region is a vast self-replenishing storehouse capable, if properly handled, of yielding a perpetual supply of diverse forest products for consumption by the great population which surrounds it.

This is, briefly, the subject matter with which the Appalachian Experiment Station will have to deal. The station comes into the region at a time when the virgin forests that once covered it have been reduced by lumbering to a small fraction of their former extent. Recurrent fires have crippled much of the second-growth on logged-over lands, have reduced the reproductive vigor of the virgin forest, and have left some large areas in a badly depleted or wholly wrecked condition. The chestnut blight threatens the entire destruction of one of the most valuable and abundant species. It will be the function of the station to discover, by intensive study and experiment, the ways and means of restoring tone to the forest, of reclothing the coves, slopes, and ridges with the most valuable and rapid-growing species, and of striking the delicate balance between the various uses of the forest which will yield the highest aggregate benefit to the entire region.

This is obviously a set of ideals that cannot be attained in a short time or without large effort. The methods of scientific research will be used. Research supplants conjecture by fact. It does so by means of experiment, which may be called concentrated experience. The old negro who said that "good judgement am de results from experience, and experience am most ginerally always de results from po' judgement" did not have the experimental method in mind. We are going after a basis for "good judgement" in a different way. Forest research, in and out of experiment stations, has already advanced far enough to show how a great many of the problems in forestry may be attacked with good promise of success. Some of the methods of approach are round about and highly technical. Others are just ordinary common sense and close observation. We are fortunate in being able to begin our work by drawing upon an already existing experience in methods of forest research and the principles derived from them. With this as a starting point we hope to build up a knowledge of the forest requirements and the factors governing tree reproduction and growth in the Southern Appalachians that can be applied directly towards perpetuating the stands and improving them in quantity, quality and variety of wood products.

We are going to co-operate to the fullest extent possible with the private timber owners in the region. It happens, however, that this region contains large areas of national forest lands, which afford a splendid laboratory for field studies. It is too early in the history of the station to outline any definite program of investigations. This will involve a very thorough consideration of the needs of the region. So far as the national forests are concerned, these needs are already objects of administration, and can be stated under three general heads: (1) the development and upkeep of a continuous supply of lumber and other wood products, with reference also to their improvement in quality; (2) the restoration and maintenance of protection forests on the watersheds of streams rising in this region; (3) the development of incidental uses of the forests, such as grazing and recreation. It will fall to the experiment station to determine for different parts of the region and for different forest types how these results can best be accomplished. In general, therefore, the subjects we are going to study will probably be found mostly in the following classes: the characteristics and requirements of the different tree species, with a view to the encouragement of the better at the expense of the poorer; the classification of forest types and sites as a step toward the better management of each; the methods of cutting best adapted to securing the natural reproduction of desirable species; forest fires, introducing a wide range of questions in-

cluding their effects upon reproduction and young stands, and the use of controlled burning as a means of facilitating and protecting reproduction; methods of management which will produce forests offering the greatest protection to watersheds, the greatest regulation of stream flow, and the prevention of erosion; studies of the rate of growth of different species of trees under different conditions as a basis for determining the length of rotation and estimating the income from private or public forestry; tree measurements, to determine the volume in terms of various products; the development of methods of artificial reforestation, including both nursery practice and field planting; problems connected with the death of chestnut from the blight, and its replacement by other species; the proper place of grazing in the scheme of forest management; methods of brush disposal; and other subjects connected with the protection and rejuvenation of the forests and the increase of their value. In short, the problems ultimately to be covered are expected to develop the whole technical basis for the practice of forestry for the species, types and conditions of the region. The results obtained will apply not only to the administration of the national forests, but also to the handling of privately owned commercial tracts and even farm woodlots.

Manifestly this is a large order. With the small force of men and the scanty funds available a rigid selection of problems, in order of importance, must be made. Furthermore, not all the problems to be undertaken are susceptible of early solution. In many of them results can be obtained only after 5 or 10, perhaps more, years of periodic observation and measurement of sample plots. After all, however, these periods are not long, and the investments are small in comparison with the possibilities of increased productivity of the great areas which the experiment station will serve.

Just a word more about the station. Its technical force consists of three men in addition to the writer: Mr. E. F. McCarthy, Mr. C. F. Korstian, and Mr. F. W. Haasis. Our staff is quite cosmopolitan, combining training in forest investigations in Canada and New England, the Inland Empire, the Southwest, and the Southern Appalachian region itself. Its members bring a collective experience in practically all kinds of technical outdoor forestry, silvicultural and economic, theoretical and practical.

**T**HE annual normal production of lumber in France is about 2,000,000,000 board feet, with nearly 4,700,000 cords of firewood. Total annual production of maritime pine in southwestern France is about 644,500,000 board feet according to a late report of the U. S. Consul at Bordeaux. Maritime pine is an important source of wealth to this district, next to vineyards and naval stores.

**F**URNITURE wood, to the value of \$402,963, was exported to Egypt from the United States in 1920, compared with \$178,875 in 1919 and \$267,244 in 1913.

## A CONCERT ON HARNEY PEAK

**D**URING the past many unusual things have occurred on and near Harney Peak, highest point in the Black Hills of South Dakota; but it remained for a troop of

Boy Scouts of America to set the precedent of giving a band concert on this loftiest pinnacle between the Rockies and the Himalayas, on June 6.

The two to three thousand tourists who visit Harney Peak each summer usually feel that carrying their own weight up and down the three miles of mountain trail is effort enough, hence the Scouts in bringing their instruments, including bass drum and large horns over the trail, marks a



AMBITIOUS MUSICIANS

Proving their desire to rise in the world, this Boy Scout Band decided to give a concert on Harney Peak, 7,240 feet high—the highest point in the United States east of the Rockies.

decided innovation in Harney Peak history. The organization, which was made up of twenty members of Troop One, of Lemmon, South Dakota, made a tour of the Hills in charge of Scoutmaster E. Dickinson and Assistant Charles Olson, the musical programs being arranged by Bandmaster Dave Clark.

The itinerary of the trip, which was made in motor trucks, includes Newell, Belle Fourche, Spearfish, Deadwood, Lead, Sylvan Lake, Hot Springs, Wind Cave, Sturgis and other well-known points of the Hills. An added feature of the concert on Harney Peak was that it was enjoyed also by guests at Sylvan Lake and the Forest Service officers at Custer, who listened in by telephone.

**F**RANCE it is estimated, lost 10 per cent of its lumber and 6½ per cent of its firewood in the World War. Before the war the forest area of France was 24,430,000 acres or about 18.7 per cent of the total land area. Of this 29 per cent was in oak and 19 per cent in beech.

The Service of Forests of the French Department of Agriculture estimated early in 1919 a loss of nearly 1,500,000 acres of wooded area due to the war, and the destruction of more than two billion board feet of lumber.



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## RESOLUTIONS FOR THE SNELL BILL

**T**HE Utah Academy of Sciences in resolutions states: "It is recognized that the timber supply of the nation is rapidly becoming depleted;

"The forest resources are of the greatest importance in the economic and industrial development of Utah and of the entire nation;

"The maintenance of proper forest conditions on important watersheds is conducive to a regular and continued stream flow and an adequate supply of pure water so essential for domestic, hydro-electric

and irrigation use;

"Be it resolved, That the Utah Academy of Sciences strongly endorses the conservation of forests to the extent of maintaining all potential forest land in a highly productive condition. With this purpose in view, we, therefore, strongly urge the adoption of a national forest policy for the entire nation similar to that proposed in H. R. 15,327, introduced in the third session of the 66th Congress, commonly known as the 'Snell Bill.'"

## CARELESS TOURISTS START DESTRUCTIVE FOREST FIRES

Because of the war, Germany lost about 21,547,520 acres of land exclusive of plebiscites. This was undoubtedly a serious national misfortune to Germany. The United States, during the period 1916-1920, inclusive, burned up 56,488,307 acres of our forested area—over 2½ times as much as Germany's entire loss—an area greater than New York and Pennsylvania combined, or of Minnesota, Kansas, Idaho, or Utah.

While it is impossible to trace the origin of all forest fires, the records of the Forest Service of the United States Department of Agriculture show that a large number originate through the carelessness of happy-go-lucky tourists. The Forest Service is anxious to encourage the use of the National Forests as recreation grounds. It cooperates with plans for building fine roads through the forests, and establishes numerous free camping grounds, where shelter, water, and firewood may be obtained. Many of these camps are located on main automobile highways and are easily reached. Some States provide tourist guide maps to the forests and camp sites. About 5,000,000 people, it is estimated, use the forests each year during the vacation season. At Eagle Camp Ground on the Columbia River Highway in the Oregon National Forest, 132,000 tourists registered last year.

Some of the campers, however, do not seem to appreciate the pleasures and privileges afforded to the touring public. They disfigure the scenery with rubbish and filth, they disregard game laws and pollute streams, but their worst and most frequently recurring offense, according to forest officers, is the starting of destructive fires by carelessness either with camp fires or with smoking.

A lighted cigarette thrown into dry leaves or needles, may start a fire that will spread for miles. A camp fire not fully extinguished may be the means of destroying valuable timber which has taken hundreds of years to reach maturity. The reports of forest rangers are filled with dramatic accounts of the work involved in controlling such fires, and also in detecting and bringing the culprits before a judge after following the very slight clues obtainable in a deserted camp site. Sometimes an old bottle or a pocket handkerchief will reveal the original possessor who did not put out his fire. Sometimes a particular make of automobile tire can be traced for miles and the careless camper brought to justice.

No fines, however, on the part of the local magistrate, will restore the burned area. While forest rangers are vigilant and alert to catch carelessness and prevent incipient fires, the real need, the foresters say, is for the development of more conscience on the part of the public which uses the National Forests. It is greatly desired by the Forest Service that all the 147 National Forests, from the Atlantic to the Pacific, and from

Golf to Border, be used and enjoyed to the fullest extent by as many people as possible. This involves universal adoption of the slogan, "Be sure your fire is out!"

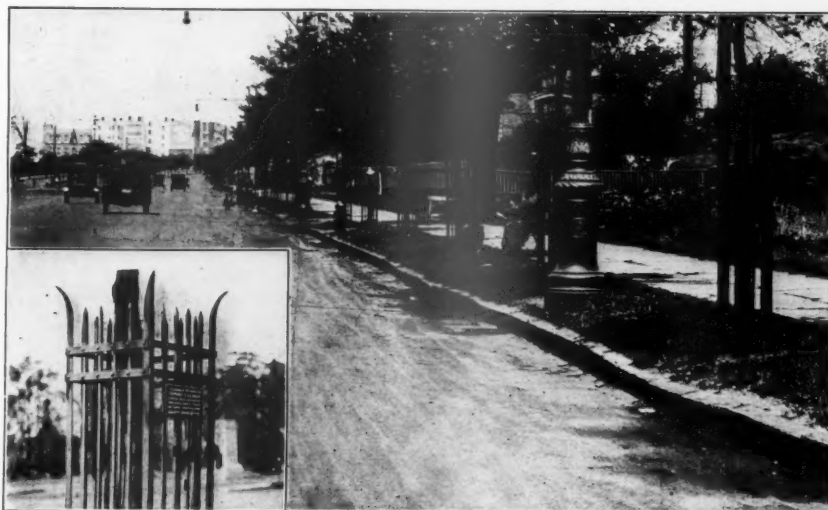
#### LUMBER DATA FOR DEPARTMENT OF COMMERCE

Mr. Franklin H. Smith, Assistant Secretary of the National Lumber Manufacturers Association, has been working with Dr. F. M. Surface of the Department of Commerce in gathering basic data relative to the lumber industry for use in the Department's monthly publication "Survey of Current Business."

The "Survey of Current Business" is a summarization of relative figures dealing with the movement of products in many lines of business. The publication gives expression to the views of Secretary Hoover for the necessity for a correlation by the government of statistics compiled by many sources on the production, consumption, shipment, stocks, importation and exportation of raw materials and finished products.

#### TROOPS TO FIGHT FIRES

Adjutant General Beary and Chief Forester Pinchot of Pennsylvania have agreed upon a plan to use the State's cavalry troops, located in the mountainous sections of the State, to combat forest fires. The mounted troopers, it is believed, will be specially valuable in rounding-up fire fighters when they are needed to check the spread



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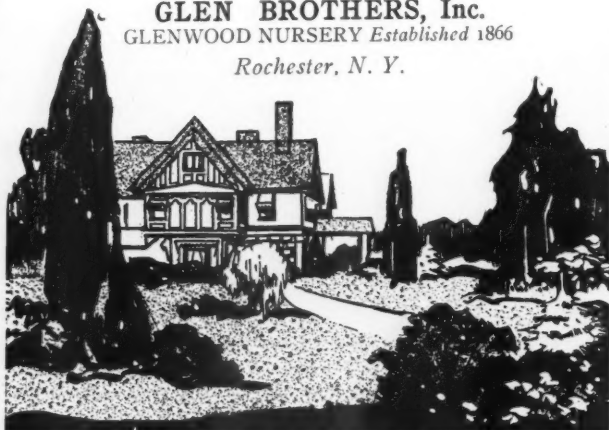
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of flames. The plan was suggested to Forester Pinchot by District Forester R. B. Winter, of Mifflinburg, who worked it out successfully with Captain Donald Zimmerman, commanding officer of Troop M, of Lewisburg. Volunteers for the forest fire service will be recruited in each cavalry troop in the interior of the State. Because of their favorable locations, troops in the following places will be asked to cooperate: Bellefonte, Lock Haven, Boalsburg, Harrisburg, Tyrone, Carlisle, Punxsutawney, Altoona, and Chambersburg.

### TREE PLANTING IN VARIOUS STATES

In New York State over 60,000 acres are reported by State Forestry officials to have been planted with trees, mostly pines, since 1901.

Thousands of Scotch and white pine trees have been planted in various sections of Massachusetts this season.

Louisiana has called upon her boys to help replant her forest land and an annual prize of \$500 is offered by a big lumber

company to be divided among the boys showing the best stand for trees of any artificial plantation.

As a result of plantings of pine seedlings begun 18 years ago on the plains of Nebraska, 5,000 acres of young forest have been successfully established. Some of the trees today are 25 feet high.—(*National Lumber Bulletin*.)

### PENNSYLVANIA'S FORESTS

**F**IGURES compiled by the Pennsylvania Department of Forestry indicate that the commonwealth has made a net gain of more than \$4,750,000 on its investment in state forests. The statement shows the total purchase price of the 1,125,611 acres now handled by the Department of Forestry was \$2,545,134.65.

Since 1898, when the Department of Forestry began purchasing forest land, there has been expended for administration, development and improvement \$4,702,155.96, making the total investment and expenditures \$7,247,290.61.

It is estimated that the state forests are now worth about twelve million dollars, consequently, the net gain has been \$4,752,709.39. Commenting on this profit, Chief Forester Pinchot said it shows conclusively that the state's forest holdings are an investment and not an expense to the commonwealth.

The financial statement showed further that the Department of Forestry has paid for road, school and county taxes \$616,040.17 to the counties in which the state forests are located.

### NEW YORK STATE COLLEGE OF FORESTRY

Prof. R. R. Fenska has resigned as assistant professor in forestry at the University of Montana to become professor of forest engineering at the New York State College of Forestry, Syracuse university.

Professor Fenska is well equipped for his profession, having spent his early years in the pine forests of Wisconsin, where his father was a pioneer lumberman. He was graduated from Beloit in 1911 and from the Yale forestry school in 1913.

He served two years as forester's assistant on the Wisconsin state board of forestry and instructor of forestry at the University of Wisconsin where he carried on work at the United States forest products laboratory.

### FINLAND'S FORESTS

Finland, with the largest percentage of forest area of any country of Europe is in a position to export about two billion feet of lumber annually, estimates Trade Commissioner Axel H. Oxholm of the Department of Commerce in a special report on the forest resources, lumber industry and lumber export trade of that country, just published by the Bureau of Foreign and Domestic Commerce for the information



of American lumbermen and exporters.

Seventy-five per cent of the forests of Finland are pine and spruce, and about 25 per cent broad-leaved species. Exports before the war were confined mostly to European countries. Now, however, Finnish exporters are making energetic efforts to widen the scope of their activities, the Trade Commissioner tells American lumbermen who may feel the force of this greater competition in their foreign markets.

The report covers Finland's forest resources, lumber industry and lumber export trade in exhaustive fashion. It discusses the forests, lumber manufacture, cost of production, export trade, prices, character of timber, markets, shipping and similar subjects in detail. It is known as Special Agents Series No. 207: "Forest Resources, Lumber Industry and Lumber Export Trade of Finland." Its price is 30 cents a copy, and it can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., and from the district and cooperative offices of the Bureau of Foreign and Domestic Commerce.

#### CALIFORNIA SERVICE MEN GIVE UP SMOKING

Realizing the danger of forest fires from burning tobacco even when used in the woods by the most careful persons, District Forester Paul G. Redington has called upon the field men of the National Forests of the California District to refrain voluntarily from smoking during the next few months of extreme fire danger.

"The forest ranger recognizes," the District Forester said, "that smoking accidents will happen and that even the most careful man has lapses." Further, it is, of course, the duty of every forest officer to do everything within his power by example, education, and otherwise to eliminate the serious hazard which results from careless smokers in the forests.

"A large body of forest officers will undoubtedly go without their smokes this summer for the good of the cause and this fact should be an important factor in driving home the idea of care with fire, both to the general public and to the thousands of people who come in contact with the rangers on the job," said Mr. Redington.

"I am asking every one of the more than 500 field men in this District who is a smoker if he desires to place himself on record as agreeing to refrain from smoking in the woods during the dangerous fire season, except when in camp or at regular places of habitation, and I believe that I know our forest officers well enough to say that the large majority will be glad to deprive themselves of a friendly pipe or cigarette as they go about their work this summer if they can help the cause of forest fire prevention by so doing," the District Forester remarked.

At present the fire situation is very critical.

Precipitation has been very low, this year, with the prevalence of hot, dry winds and the opening of the deer hunting season within the next few days in several of the coast counties, increases the fire hazard considerably. However, the forest officers are hoping that the great number of users of the National Forests will be more careful this year than ever before, and that the percentage of man-caused fires may be greatly reduced from the high figure that it has held for the past several years.

#### FORESTRY PLANTATIONS AND MEMORIAL TREES

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## CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PAST PRESIDENT CANADIAN SOCIETY OF FOREST ENGINEERS

Quebec has experienced the driest spring and early summer for many years. For over six weeks scarcely a drop of rain fell and the woods became so dry that on rocky slopes, where the soil was thin, the trees died entirely. The soil in the forests was like so much tinder and any fires which started sprang up again and again after they were extinguished and even after heavy rains had fallen. The fire would get into rotten logs or duff and creep along underground for unbelievable distances and reappear again after everyone thought the danger was over. Owing to a large number of men being without regular employment, many persons were fishing in the woods and to them the greatest number of fires was directly attributable. The railroads showed a very great improvement in the matter of setting fires, notably the lines under the control of the Canadian National Railway, which has been the worst offender in the past. The number of fires set by farmers was greater than ever owing to carelessness in enforcing the permit law and in the issuing of permits, but the damage was mostly confined to their own woodlots.

The employees of lumber and paper companies working on drives and so forth, showed a marked improvement. Many fires were set by people driving along country roads and throwing matches and lighted cigarettes into the bushes. When the character of the weather is taken into consideration the total losses are surprisingly small and this is due in great measure to the fire fighting activities of the cooperative protective associations. The cost of fighting fires will run to a very large amount.

There are two very striking lessons to be learned from the spring season. The first is that measures which are entirely adequate in ordinary seasons break down in exceptional ones. The second is that the old method of patrol by men in canoes is practically useless. Travelling as they do in the river valleys, they cannot see smoke until a fire has assumed large proportions and the only way forest fires can be controlled is by putting them out almost immediately. In spite of the cost lookout towers connected by telephones must be installed or better still an aerial patrol must be installed. It is absolutely impossible for the man in charge of fire protection over an area of, say 15,000 square miles to handle it intelligently and properly by travelling around by buggy and canoe. He should be at all times in personal touch with the situation and should not be dependent on the reports of others. When it takes two or three days of fatiguing travel to get from one part of his district to another when he might do the same thing in an hour and a half, he is wasting time and energy. During a dangerous season reports are coming in all the time of new fires and many of these are false or exaggerated. They worry and annoy a man exceedingly and often lead him or his men on wild goose chases. If he travelled by air he could at all times make the circuit of his district and see every fire in one day and get back to headquarters the next night. Being able to see just what was going on he could lay out and direct his work much more efficiently and intelligently and save much worry and exertion. Having all his inspectors and rangers absolutely under his eye they would be much more efficient and also people would be more careful about setting fires. In a patrol carried out by the Laurentide Company this spring a daily report was received of all the fires in a territory of ten thousand square miles. The report covered fires previously burning, with sketches and photographs showing the areas burnt to date, new fires, giving lo-

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cations exactly even to the number and range of the lot, and whether they were being attended to or not. With a plane fires can be reported when the first wisp of smoke rises and it is perfectly possible for a plane to land a man or men at a lake near a fire to put it out and then go back and report and if necessary bring men and a gasoline pump to the fire. With pigeons or wireless the report would be even quicker. A report by plane would at the most mean only one and a quarter hours flying. It is too bad that the protective associations will not employ planes. The cost of fire fighting alone this season would have installed many planes and the men necessary to operate them and the timber lost would have paid for such service for many years.

The fire situation in British Columbia and the Prairie Provinces seems not to have been bad this year as few reports of fire have come in. In Ontario the Fire Protection system instituted a few years ago seems to be working much better than last year. Some complaints have been made but the efficiency seems to be increasing. In Nova Scotia the season has been a very bad one. This Province has been urged for a long time to appoint a forester and to organize a proper protective system but nothing has been done with the result that much damage has been caused this year. In New Brunswick there is an efficient fire protection service, but this seems to have broken down on account of exceptional weather conditions and much damage has been caused both in the forest and by the burning of settlements and summer resorts.

Much of the damage caused this year has been due to fishermen. Many of these seem to be men who were out of work and having nothing else to do went fishing. There seems to be only one answer to a problem of this kind and that is to compel every man who goes into the woods for any purpose to first obtain a permit from the local fire-ranger. This would cost no money and would work no hardship and it would at the same time make people more careful as there would be absolute proof that they were in a certain locality and if a fire started there they would be charged with setting it. The Quebec Government was urged by the lumbermen two years in succession to pass such a law but they refused on the ground of the possible political consequences. The holders of licenses to cut crown timber were told that they had all the rights of tenants and could forbid anyone to enter on lands under lease or make the taking out of a permit a requisite. Of course the individual lumbermen and even the protective associations hesitate to take such a step as disgruntled individuals might set incendiary fires. If it were the law no one would think anything of it and the associations could see that it was enforced. Strong pressure

will be brought on the Government this coming session of the legislature to enact such a law and it is hoped that it will be successful.

Mr. G. C. Piche, Chief Forester of Quebec and Mr. Edward Beck of the Canadian Pulp and Paper Association have just returned from a trip to Scandinavia, France and England, where they have been looking over forests and into forestry conditions. Mr. Beck has written a very interesting series of articles for the Canadian papers, which have been widely published and which have been read with great interest.

There are rumors of a reorganization of the Forestry Department in Ontario. This is badly needed and it is to be hoped that men will be chosen who have not only technical but business ability and who will be free from political strings. This great Province has great natural wealth and the conduct of its forest policy leaves a great deal to be desired. There is needed a Department of Forestry free in all its branches from political patronage, with a continuous and consistent policy. There is great need to revise the method of timber sales and the collection of dues on timber cut on Crown Lands. A Commission is now investigating this and much carelessness has come to light which must have meant a large loss to the Province in revenue. Scaling regulations need to be changed and the scalers to be freed from dependence on the lumbermen. The fire protective system needs to be much improved and the most excellent ideas of the Premier on reforestation should be put into operation without delay.

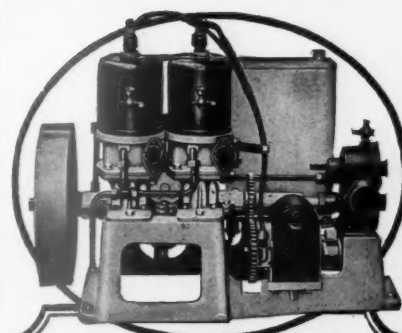
Almost all the wood-using industries are overstocked with wood and there will be very little cutting of timber this winter. Many men who earn their living in the woods will be without work this winter and there will be a very considerable falling off in revenue to the Provincial Governments.

#### FORBES HEADS SOUTH'S NEW FOREST STATION.

R. D. Forbes, Louisiana State Forester for several years, will serve as director of the southern forest research and experiment station of the Forest Service. Congress provided an appropriation which became available July 1, and the selection of Mr. Forbes is recognition of his standing as a successful and thoroughly competent forester, and of his administrative ability.

For the present the headquarters of the new station will be in New Orleans. He will begin his new duties at once, with a staff of three trained technical experts assigned from the Washington offices.

It is believed that V. H. Sonderegger, who has been Mr. Forbes' assistant in the State forestry work, will succeed him as State forester of Louisiana.



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## TO STOP FOREST FIRES

NEW YORK STATE'S forest fire protection service will be enlarged and strengthened by an increase in the funds allotted to the state by the federal government. New fire-fighting apparatus of the latest and most effective type will be purchased and additional fire districts will be organized, covering forested portions of the state that heretofore have not been included in the fire towns. Conservation Commissioner Ellis J. Staley has received from the United States Forest Service notice of its approval of the plan of co-operation between the state and federal authorities, under which the national government adds \$22,050 to the money appropriated by the state for fire protection work. Under the new plan of co-operation, which was worked out at a conference between Clifford R. Pettis, Superintendent of State Forests, and Louis S. Murphy, acting Chief of the Eastern Division of the Forest Service, the federal government will purchase four forest fire pumps and turn them over to the Conservation Commission and provide for the establishment of new fire districts in the eastern, southern and southwestern portions of the state.

**"Take No Chances  
With Camp Fires  
Put Them Out."**

FIRESSETTER CAUGHT BY AID OF  
TELESCOPE

In July, 1921, Alonzo E. Dole, a professional land locator operating in the Siuslaw country for years was convicted in the United States District Court at Portland, Oregon, on the charge of wilfully setting forest fires on the Siuslaw National Forest. He was sentenced to four months in the Multnomah County jail, and his application for a new trial was denied.

Dole had long been suspected by officers of the Forest Service of the United States Department of Agriculture of wilfully setting fires on the Siuslaw National Forest, but owing to the sparse settlement of the great forest area and consequent lack of witnesses, and the further fact that by long practice he had mastered the trick of flipping a burning match in the brush along a road or trail, even on horseback, efforts to obtain evidence against him were long unsuccessful.

The circumstances in connection with Dole's arrest and conviction were somewhat unusual. As shown by the evidence, one of the witnesses was trying out a new telescope by watching occasional passers-by on a road a few hundred yards away. While doing, he saw Dole, who was riding by on horseback, strike matches and flip them, while burning, into the dry ferns and brush along the roadside, thus starting fires.

VOLUNTARY AIR FIRE-PATROL  
WORK

An airplane patrol in the Pikes Peak region is being carried on without cost to the Forest Service of the United States Department of Agriculture, says the *Weekly Bulletin*. A Colorado aircraft company has an agreement which calls for constant lookout for fires during regular trips, and special trips to locate smoke are being made at the request of the Forest Service. The pilots, who are appointed special unpaid fire guards, are provided with maps and telephone directories of forest officers, and the airplanes bear on their wings, in neat letters, "Official Forest Service Patrol."

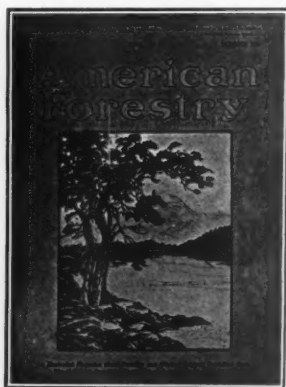
This patrol may cost the aircraft company a good deal, if many special flights are necessary. The company, however, does not expect to charge the expense to philanthropy; it believes that it can render this public service gratuitously and at the same time its planes will be known as the ones which do this special fire patrol work. There is no Army air field anywhere near this district with which the Forest Service can cooperate, as on the Pacific coast, for forest fire patrol, so it is of great advantage to the service to have this patrolling done voluntarily.

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## BOOK REVIEWS

A Short Manual of Forest Management—By H. Jackson. Macmillan (New York).

In his preface the author states that the object of the book is to present a brief and simplified text-book on forest management, based on a practical foundation, and he has eminently succeeded. The subject is, of course, thoroughly covered by standard works familiarly known, but these are expositions of the highest theory and somewhat formidable for the ordinary student or for the public—this little manual is the bridge between. Undoubtedly it will be well received and serve a most useful purpose.

The Red, White and Blue Manual. Johns Hopkins Press, 1921.

Volume I, Red Course. A textbook for the citizens' military training camp. By P. S. Bond, lieutenant colonel, Corps of Engineers, U. S. A.; O. O. Ellis, late lieutenant colonel, A. E. F.; E. B. Garey, major, infantry, U. S. A.; T. L. McMurry, captain, infantry, U. S. A.

This volume is the first of a series of three manuals, especially prepared to meet the needs of students at military training camps. The "Plattsburg Camps", which became famous under the leadership of General Leonard E. Wood before our entry into the World War, inaugurated the system of volunteer military training camps for citizens, and the Citizens Military Training Camps, now conducted by the War Department, are the logical outgrowth of the Plattsburg idea. The training given will be thorough and systematic and as the need was felt for a series of manuals for the students, a revised and greatly improved "Plattsburg Manual" is here offered for the "Red" or first-year camps.

The Ranger. Published as a monthly by the Filipino Ranger's Association.

This interesting paper is devoted to the interests of forestry, lumbering and the conservation of natural resources in the Islands. It declares editorially that "the conservation of our natural resources is the greatest internal problem before the country today, and forestry touches the conservation of all our natural resources," and goes on to say that "passage of wise legislation and liberal appropriations for the development and utilization of our natural resources constitute the chief hopes of the Filipino people."

These statements indicate clearly that the necessity for economic development in the ultimate achievement of independence is fully realized by leaders of thought in the Islands and are a good indication that the necessary reforms are under way through the practical application of educational propaganda. The development of forestry and proper conservation in the Islands is going bravely forward and this paper is welcomed as the spokesman of the Ranger Association.

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AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

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**EX-SERVICE MAN** wishes employment with some Forest Construction Concern or Irrigation Company which can use a young man who is a Technical High School Graduate, and who is a Mechanical Draftsman with some slight knowledge of plane surveying. Willing to work and can do same. Address Box 2005, AMERICAN FORESTRY MAGAZINE, Washington, D. C. (6-8-21)

**CAN YOU USE ABILITY?**—Young man, technically trained with master's degree in forestry desires position of responsibility with some lumber or forest products company. Fifteen months experience. Address Box 212, Lockhart, Alabama. (8-10-21).

**POSITION WANTED** as City Forester or Park Superintendent. Have had practical experience as Manager of Private Estates and have been 14 years in present position as Park Superintendent. Desirous of making a change at this time. Address Box 3005, care of AMERICAN FORESTRY, Washington, D. C. (9-11-21)

**TREE SURGEON**—Formerly employed by the Davey Tree Expert Company, desires to make connection with some reliable company doing work such as tree surgery, or private work on large estate. Will consider reasonable salary to start if good future offers. Address Box 3010, care AMERICAN FORESTRY, Washington, D. C. (9-11-21)

**MARRIED MAN** would like position as CITY FORESTER or in charge of large private estate. Any forestry position will be considered as a change in locality is desired. Have had technical training and recently graduated from one of the foremost forestry schools of the country. Ex-service man, having spent three years in the service. Address Box 3020, care AMERICAN FORESTRY Magazine, Washington, D. C. (9-11-21)

**CITY LANDSCAPE ARCHITECT AND FORESTER**, thoroughly conversant with Southern conditions, desires to change. Correspondence invited. Address D, care AMERICAN FORESTRY Magazine, Washington, D. C. (9-11-21)

### POSITION OPEN.

**POSITION** of Secretary-Treasurer of Forest Protective Association of Timberland Owners open. Duties will be to conduct correspondence, keep accounts, canvass for new members, work out publicity campaigns, etc. Applicants should state salary desired. Address Box 550, in care AMERICAN FORESTRY, Washington, D. C.

## KILN DRYING COURSES AT MADISON

Ignorance of the nature of kiln drying defects and of the effects produced by them in subsequent manufacturing operations is responsible for a great deal of loss in lumber-producing and wood-using industries. Many plants are consistently taking losses which they could easily avoid if they only knew that these losses were unnecessary.

This fact has been brought out most forcibly at every one of the seventeen short courses in kiln drying which have been given by the Forest Products Laboratory. The students frequently don't understand the extent of their difficulties until they have learned what results can be secured by really good practice.

There is great need for general education upon this subject. The laboratory makes every effort to carry on this educational work by means of advice given through correspondence, consultation at the laboratory, lectures, and publications. Several thousand plants throughout the country avail themselves of this service every year. Once they understand what can be accomplished by up-to-date equipment and methods, the securing of the necessary detailed knowledge is an easy step.

It is to assist the manufacturer in taking this step that the short courses in kiln drying are conducted. They are especially adapted to the requirements of practical men and the lectures are given in simple language which anyone can understand. Experience has shown that the amount of good each student secures from the course depends wholly upon his own capabilities.

The dates for the next four courses are August 15-16, September 12-23, October 10-21, and November 7-18. Enrollments for any of these courses may be made now. The cooperative tuition fee of \$150, which is less than the actual cost of instruction, may be paid at any time during the course. Address Rolf Thelen, in charge section of Timber Physics, Forest Products Laboratory, Madison, Wisconsin.

Edward F. McCarthy, first forester in the faculty of the New York College of Forestry at Syracuse, has been given an important new position in the United States Forest Service, being assigned to the new forest experiment station being established at Asheville, North Carolina. He will rank next to the director of the station, one of the old forest service officials, and the taking of a man from outside the service for so important a position is somewhat unusual.



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